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INCIDENT IN THE SIEGE OF THE RAJPUT CAPITAL, CHITOR.—The historian accompanying the Imperial army before Chitor tells us that "gallant spirits of the army were continually rushing upon it and daringly attacking it. But as terrestrials cannot reach celestials, so their efforts were abortive. Accordingly an order was issued that proper spots should be selected and that there the walls and bastions of the fort should be mined and that then the mines should be filled with gunpowder and set on fire." A covered way or "path of safety" beneath which Akbar's sappers worked at laying the mines is here shown. This illustration is reproduced from an Indo-Persian manuscript. Date, A.D. 1681.

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An Address
ON
PRIMARY SUTURE OF WOUNDS AT THE FRONT IN FRANCE.*

BY
SURGEON-GENERAL SIR ANTHONY BOWLBY, K.C.M.G., K.C.V.O., A.M.S.,
CONSULTING SURGEON, BRITISH ARMIES IN FRANCE.

1914.

SOON after the commencement of this war surgeons were brought in contact with a terribly septic condition of the wounds, and extensive prevalence of spreading gangrene. It was perhaps natural that those who were not at the seat of war should attribute these occurrences to the imperfections of those who were, and it was also natural that everybody should try and improve matters by advocating various methods of treatment which had either in their experience proved of value in civilian surgery or were theoretically likely to be of use.

The remedies advocated fell into two classes: First, strong antiseptics, which it was believed were capable of arresting sepsis if applied early enough and strong enough. Second, the acceptance of the fact that antiseptics were of no use, and that no treatment could possibly so antagonize the innumerable bacteria as to permit of the early closure of the contaminated wounds, which therefore must be left as widely open as possible, and encouraged to discharge.

The first disappointed us, and may be described as a counsel of false hopes; the second remained as a counsel of despair as far as primary union was concerned, and it was left to the surgeons with the troops to try and ascertain by the long but sure tests of the experience of many wounds whether either class of counsellors were right. It was only too evident before long that both of the methods advocated left much to be desired, and it was soon appreciated that the surgeons of all the combatant armies, of whatever nationality, were face to face with wound conditions which were quite new to them and which presented problems only to be solved by careful and laborious investigation. No one at that time was in a position to dictate to others what was the answer to the questions, What is the best method of combating the all-prevailing sepsis? and How can wounds be got to heal quickly and safely?

1915.

But as time went on the darkness of ignorance was slowly illuminated, and things became clear which had long been obscure. We realized that we had attributed too much power for evil to the microbic invasion; that the infection was too gross to be combated by antiseptics; and that the source of the danger was to be sought for in the damaged or dead tissues contaminated by the mud of the manured fields and in the portions of the muddy clothing and the missiles which were buried in the wounds. We learnt that a tissue deprived of its blood supply was the focus of danger, and, lastly, that our most dreaded foes, the bacteria of "gas gangrene," lived and flourished chiefly on the muscular fibres which had been crushed by the missiles. We knew now why it was that our early attempts to combat sepsis had failed, and on this foundation composed of facts we began to build an edifice which, though still incomplete, is infinitely more secure than those we had tried to erect upon the shifting sands of ignorance and theory.

At first we thought it enough to open up wounds and to remove missiles, but as soon as a little more knowledge was acquired we began to excise the damaged tissues, at first very sparingly, but, as we learnt to recognize the signs that indicated the extent of muscle crushed or infected, more and more attention was paid to the complete removal of as much as seemed likely to prove a dangerous centre of infection. And to-day we know that the one and most necessary method of treatment is the careful and thorough mechanical cleansing of the wound and the complete removal of all dead or partially devitalized tissue. Without this, antiseptics are useless, and, in proportion as technique is good, and excision can be done early and can be really complete, antiseptics applied inside the wound are merely accessory. The one condition for success is that this complete surgical cleansing must be performed before the bacteria have had time to penetrate too deeply or to spread too far, but of this there is more to be said later.

In the early days of the war no cases did worse than those in which the surgeon had completely sutured the wound, and the experience of many surgical disasters prevented any return to such treatment for a very long time. The consequence was that, after an operation of excision, the wound was habitually left open, and only after a disinfecting process, such as that provided by the ingenuity of Carrel, was any attempt made to close the wound by secondary suture.

THE BEGINNINGS OF PRIMARY SUTURE.

It is interesting to note how the systematic treatment by primary suture began with the knee-joint, and how it has grown. Early in the war, wounds of the knee-joint were very commonly followed by suppuration of the most severe and dangerous kind, and this although many of the surgeons in France knew the danger of drainage tubes in the articulation and avoided it. But it was soon realized that many perforating wounds of joints did well, even although the synovial fluid was infected, if only they were not opened up and drained, and the natural conclusion was that if the wounded joint could be closed, after the removal of missiles, and after thorough surgical cleansing, it might also do well. As soon as this practice became common, not only did many of the joints not suppurate, but the skin wounds also healed by first intention in a very large proportion of all the cases, and we found that the surgical ideal of a healed aseptic wound had been attained.

Very cautiously, the practice of primary suture was applied to other wounds, and nowhere was it of greater value than in wounds of the brain and fractures of the skull. Injuries which had been treated in the early days by drainage with bad results were now treated by surgical excision and primary suture of the scalp with infinitely better results. Wounds of the abdomen were treated on the same lines, and the abdominal wall was closed after operations on the intestines or other viscera.

1916.

In 1916, and still more in 1917, operations began to be done on many wounds of the lung, and as it was soon found that success depended on an immediate closure of the pleural cavity after the operation, this closure was fortified by a corresponding suture of the skin after all damaged muscle and splinters of ribs had been removed. Here again success followed in many cases, and primary union was thus obtained in wounds which involved injured muscles and fractured bones. The position at this stage was that the knee-joint, the scalp, the abdominal wall, the thoracic wall, could all be closed by primary suture. Then why not other wounds also? And the answer was forthcoming from every side, "Other wounds of the limbs can be similarly closed, and many of them are being successfully closed by many surgeons." It was the difficulty of dealing with large masses of devitalized muscle infected by microbes that made limb wounds so much more difficult to deal with than the aponeurosis of the scalp or the fibrous capsule of the knee. To this was added the impossibility of excising large vessels and nerves exposed in a wound, and the consequent imperfection of the excision operation. In cases of extensive fracture and comminution of dirty bone the task was still more difficult when the surgeon endeavoured to make sure of reaching every portion of the damaged area. No doubt the great majority of the failures were the result of the very natural unwillingness to excise enough of the damaged muscle, but experience, surely though slowly, taught the necessary lessons, and, by the exercise of a scrupulous asepsis combined with a meticulously careful surgical technique, more and more successes were attained and wounds were closed which a few months earlier would have been considered quite beyond the possibility of suture.

PROGRESS IN 1917.

The year 1917 saw a general acceptance of the proposition that union after primary suture was, under favourable conditions, a reliable surgical fact, and the outlook of

* Delivered at a meeting of the Royal Society of Medicine on February 13th, 1918.

surgeons on the treatment of wounds was altogether different in December from what it had been in January.

At the meeting of the Surgical Conference of the Allies in Paris in May, 1917, it was agreed that operation "may be followed in some instances by primary closure of the wound, notably in the case of wounded joints," but in the following November the conclusion arrived at was: "Since our last session the disinfection of wounds has passed from the domain of the chemist to that of the surgeon. Primary suture has taken the place of secondary suture and has become the method of choice."

It is of interest to see what had happened during these six months. There was a general consensus of opinion that the time had come to try the primary suture of wounds on a larger scale, and in both the British and French armies, as well as in the Belgian, many surgeons whose hospitals were favourably situated took the matter up. A large hospital with fine wards on the pavilion system was occupied in July by both British and French units, and, working in close touch with each other, the surgeons of both nations proceeded with similar investigations. The circumstances were favourable, for wounded could be brought in quickly, could be accommodated under excellent conditions, and could be retained for an indefinite time, so that it was easy to follow wounds to the end of their surgical course.

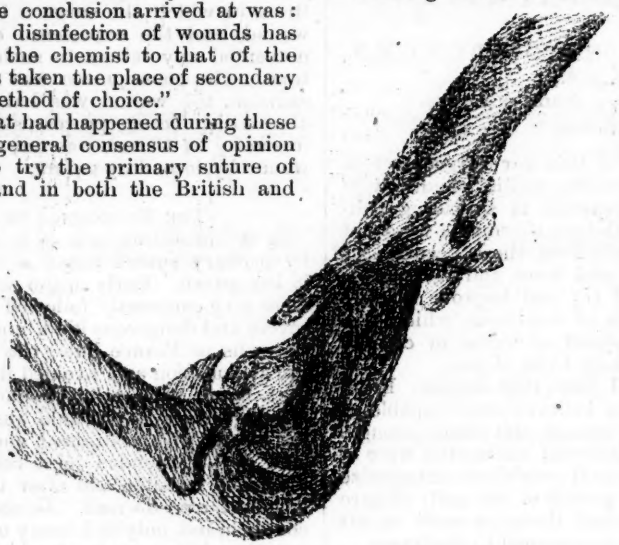

FIG. 1.—Drawing from skiagram: Case of fractured humerus treated by primary suture.

Of those patients admitted to the British unit no less than 98 per cent. were injured by shells or bombs, so that the wounds were of a very severe type and the test of the surgery was correspondingly severe. The results showed that, of 433 patients operated upon, in 67 per cent. the wounds healed by first intention, while in a great many of the remainder they healed with only a slight surface suppuration.

The results obtained by the French surgeons were equally good, and, as the wounds thus treated were of every variety, it was clear that the treatment was applicable to every class of injury. In the British unit no antiseptics were employed, in the French unit ether was used in almost all the wounds.

FIG. 2.—Drawing from skiagram: Severe comminuted fracture of femur into knee-joint. Closed on the fourth day.

We had previously initiated, in June, another series of observations in a different army, and for this investigation we employed flavine. The results of this trial were recorded[1] by Captains Drummond and McNee, and they showed that of 32 wounds closed at the time of operation 30 healed *per primam*, and 10 others healed similarly which were left open for one or two days and then sutured, making a total of 40 successful closures out of 42 cases. Further experience has confirmed the conclusions originally arrived at, that while flavine is not a good application to granulating wounds, it is a very useful agent in the treatment of freshly excised wounds. In the army area where it has been chiefly employed successful primary suture has been performed in well over 70 per cent. of the cases.

In yet another area, Captain Haycraft closed 116 wounds after treating them with a solution of soap, and his results were recorded in the BRITISH MEDICAL JOURNAL for January 19th last (page 80). Of these cases 75 healed *per primam* and 16 more after superficial suppuration. Thirty-eight of the cases were complicated by fractures of the long bones, and of these 28 healed *per primam* and 5 more after superficial suppuration.

Progressive Improvement in Results.

It will thus be seen that various surgeons, using various methods, obtained success in a very large percentage of all their operations, and similar results were being obtained in many other casualty clearing stations in different parts of the line. Meantime, the prolonged and severe fighting during the autumn months fully occupied the time of the surgeons in France. But as soon as a period of comparative quiet succeeded, we began again our observations and criticized our own methods with a view to deciding various doubtful points. To this end we arranged that one of the casualty clearing stations should become a "hospital of observation," and in this unit we have at the present time treated 175 wounds of the extremities, including many fractures. The operative work has been done by four or five surgeons, and they have employed various antiseptics, or else in some cases, and chiefly the slighter wounds, no antiseptics at all. The work here has also been helped by very competent bacteriologists, and careful records of wound infections have been kept. A complete report will be published shortly.

It is too early to draw any final conclusions on the bacteriology of the wounds which we have been treating, but it is already evident that those which heal *per primam* may do so in the presence of various organisms. Thus, Captains Adrian Stokes and Tytler report that

FIG. 3.—Another view of the fracture shown in Fig. 2.

fifty-eight cases were infected with anaërobes, streptococci, staphylococci, diphtheroids, or combinations of these. Forty-two of these were successes (as primary sutures), and 16 were failures. Of the 58, 32 grew streptococci—6 of these were of the haemolytic variety, and of these 5 were failures; 26 were non-haemolytic, of which 6 were failures. We are inclined to agree with Le Gros and Tissier that the streptococcus, especially the haemolytic variety, is by far the most important organism with which we have to contend.

And Captain McNee, in the report on flavine, to which I have already alluded, says:

Complete bacteriological sterility was rarely obtained, yet the patients were obviously doing well, and the wounds showed no signs of local or spreading inflammation. In several instances secondary suture (after a day or two) was adopted with complete

success, while numbers of organisms were still recognizable which cultures showed to be viable.

It is, indeed, evident that some bacteria may be shut up in a recent wound and do no harm, provided that all dead tissue and all foreign bodies have been removed.

Fortunately, the clinical evidence as to how a wound is doing is generally easy to obtain. A slight rise of temperature often follows suture, especially if it is done after an interval of a day or two, but, in the absence of other evidence of infection, it is not a reason for opening up the wound. On the other hand, the surgeons have found that all the cases infected by haemolytic streptococci showed such definite evidence of infection within twenty-four hours that, apart from the report of the bacteriologist, it was clear that the wounds required to be opened up, for the skin edges were red, swollen, and indurated, and a copious exudation oozed from between the stitches. It is fortunate that such reliable evidence can be reckoned on, for it might be impossible to wait for a bacteriological report.

FIG. 4.—Drawing from skiagram: Fracture of femur. Closed on third day.

The Factors of Success.

But if success is to be obtained it is necessary to take every precaution to ensure it, and one most important precaution is the use of *x* rays, for in many cases a foreign body will be left, unknown to the surgeon, unless a radiograph has been taken or a screen examination has been made before operation. It is not contended that this examination is invariably required in every slight case, or in through-and-through bullet wounds, but wounds are not always what they seem, and every precaution is worth considering.

The choice of suitable cases for suture demands a considerable experience of wounds at the front, and is not a matter to be lightly decided. We find that about one-half of the cases at present being admitted to our "observation casualty clearing station" are not suitable, and the experience of Surgeon-General Wallace gives the same proportion. Some are suffering too much from exposure, shock, or recent bleeding, to bear a prolonged operation. Some have too many wounds to allow operations to be done on all of them, while in others the destruction of skin by the missile is too extensive. Some wounds are already evidently inflamed, and others show either commencing cellulitis or gas gangrene. Not a few arrive after too long a time for closure to be safe, even if none of these conditions are present.

Danger of Delay.

This brings us to the question of "time." A little consideration will show that no time rule can be laid down to apply to all cases. Thus, an open gutter wound involving only skin and subcutaneous tissue might be safely excised and treated twenty or thirty hours after its infliction, if it showed no signs of infection, whilst a man with a large wound and a fracture of the thigh who had been soaked in mud for a similar time would not be a safe subject for closure. A good deal also depends on whether or no dangerous organisms have invaded even a superficial wound. But, allowing for these differences, it must still be said that the earlier the patients are operated upon the higher is the average of success in every class of wound. Delay means danger.

FIG. 6.—Drawing from skiagram: Fracture of tarsus and metatarsus. Suture on fifth day.

At the Allies Surgical Conference in November, 1917, M. Duval reported that of the "lightly wounded" without fractures 80 per cent. had been successfully sutured within eight to twelve hours of injury, and M. Tuffier informs me that equally good results were obtained in wounds not going as deep as the muscles even after twenty-four hours. Much must also depend on the weather, for a patient might lie out for the whole of a warm summer's night with less harm to his wound than if he lay immersed in winter mud and water for a couple of hours. Every effort should always be made to bring patients into the casualty clearing station as rapidly as possible.

FIG. 5.—Drawing from skiagram: Fracture of humerus. Primary suture.

Rest after Suture.

But although the possibilities of success are largely dependent on conditions antecedent to the arrival of the patient in hospital, it has been established that another important factor is keeping the patient at rest after suture has been performed. It seems certain that many sutured wounds are caused to ooze and to become distended if patients are sent journeys by road or rail soon after operation, and it is now a settled policy that a wound is not to be sutured at the time of operation unless the patient can be retained for at least seven days, or more in bad cases, at the casualty clearing station where the operation is done. And, as there are many occasions on which it is not possible to retain all the wounded, it happens that cases must be sent down to the base hospitals after excision has been done, with the wound unsutured and lightly dressed with sterilized gauze. The French surgeons have soaked the gauze in ether, and we have generally used flavine, 1 in 1,000, or bipp. Personally, I prefer flavine, because it has no toxic or irritating qualities, and the gauze soaked in it (and kept moist by jaconet and non-absorbent wool) does not stick to the tissues, and leaves a good surface for suture.

"Delayed Primary Suture."

The French surgeons have called the suture which is done after the lapse of a day or two "*la suture primitive retardée*," and we have been in the habit of calling it "delayed primary suture," leaving the term "secondary suture" for the closure of granulating wounds. It thus happens that a wound is often excised by one surgeon, and when the patient arrives at a hospital where he can remain at rest, sutured by another. Our observation at the front on the patients we have retained there entirely confirms the opinion of the French surgeons that there is no disadvantage in delaying suture for forty-eight hours or more. On the contrary, most surgeons with recent experience of excision and primary suture consider that there are many wounds which do much better if they are not closed at once. For, where there is extensive laceration or a bad fracture the oozing cannot always be stopped while the patient is on the operating table, and therefore it is not wise to close such a wound then and there. If twenty-four or forty-eight hours are allowed to elapse all oozing has ceased,

and suture is much more often successful than it otherwise would have been. Here also experience is required to know which wounds should be treated in one way and which in another, and much of the success obtained will depend on the decision.

It is also wise not to suture any wound at the time of excision if there is any material doubt as to whether suture should be done. It is much better to leave such a wound open till enough time has elapsed to settle the question. We generally give gas and oxygen for the "delayed suture," but various methods of local or general anaesthesia are employed. If drainage is required it should be ensured by the insertion of a doubled piece of sterilized silver wire, and not by either drainage tubes or gauze; but the sooner the wound can be completely closed the less will be the chance of infection and suppuration. If a drainage tube is used and is left in long enough suppuration is ensured.

Principles to be Observed in Primary Suture.

But, while success depends on many conditions which are beyond the control of the surgeon, it depends very largely on the surgeon himself. Let it be clearly realized that primary suture of wounds is more likely to end in disaster than in benefit unless the operation is most carefully performed, *and this implies, in the first place, the most minute aseptic precautions*, such as are commonly practised by British surgeons in their most serious operations in civil work. No more skin should be excised than is absolutely necessary; even if badly damaged it can often be saved. In the next place, the operation must be done most deliberately and thoroughly, so that no part of the wounded area escapes treatment. This all means a good deal more time than is required for the opening up and cleansing of the average infected wound which is not suitable for suture, but it is time well spent, especially if the case is one of fracture.

On the other hand, operation for the excision and cleansing of small superficial wounds can be done quite quickly, and no class benefits more than these by this method of treatment.

It is in the class of "slightly wounded," with injuries of the "soft parts," or "flesh wounds," that early and careful operation yields the highest proportion of success. Hitherto, when wounded are numerous, these patients have habitually been carefully dressed but not submitted to operation. Often many weeks or months have elapsed before their wounds have finally closed, and for all this time they have been inmates of hospitals and frequently confined to bed. Some of them have had serious complications as well. Successful suture makes a complete cure of such patients in a time measured by days or weeks instead of by months.

The benefit to the more seriously wounded is still more obvious. Not only are compound fractures converted into simple ones, but the period of confinement to bed and to hospital is greatly shortened. The absence of sepsis is well seen in the features of the patients, whose good colour tells its own tale. There is none of the general loss of flesh, none of the shrunken and stiff, wooden-like limbs which we see after prolonged suppuration, none of the stiffness of all the joints of the affected limb which is so long in recovering.

I am indebted to Surgeon-General Cuthbert Wallace for the following figures of all primary sutures performed between May and December in the army to which he acts as consultant. They include the figures I have quoted by Drummond and Haycraft.

Primary Sutures, May–December, 1917.

	Total.	Healed by First Intention.	Healed after Slight Suppuration.	Suppurated.	Not known.
Superficial wounds ...	119	74	9	—	36
Deep wounds	260	184	38	30	8
Fractures	131	93	17	21	—
Amputations	37	24	5	8	—
Joints	79	69	—	10	—
Total	626	444 (68 %)	69	69	44

One Hundred Consecutive Cases of Compound Fracture Treated by Primary Suture.

	Total.	Healed by First Intention.	Healed after Slight Suppuration.	Suppurated.
Femur	18	11	2	5
Tibia and fibula ..	5	4	—	1
Tibia	10	9	—	1
Fibula	2	2	—	—
Humerus	34	26	6	2
Radius and ulna ...	3	3	—	—
Radius	15	12	3	—
Ulna	15	8	4	1
Total	100	75 (75 %)	15	10

It will be seen that out of a total of 626 cases, 68 per cent. were successfully sutured and healed *per primam*.

At the "observation hospital" 123 wounds have been sutured, with success in 83 per cent.

Thus, in these three separate areas there is a total of 1,202 cases under various surgeons, with success in about 70 per cent. Moreover, in many of the remaining 30 per cent. there was a very early closure of the wound in spite of superficial suppuration.

The success obtained in cases of fracture is also very striking, for the table sent by Surgeon-General Wallace shows 75 per cent. of successes. The results of the observation hospital support this.

Statistics of "Observation Hospital."

	Success.	Failure.
Humerus	5	—
Forearm	1	—
Metacarpus	1	—
Femur	3	5
Tibia and fibula	2	—
Tibia...	4	1
Fibula	3	—
Tarsus	4	1
Metatarsus	2	—
Total	25	7

That is, 72 per cent. of successful suture.

Recoveries after Suture.

The amputation cases at the observation hospital have been few, but they also have been very satisfactory. Of 11 cases all the patients have recovered. Seven were amputations through the thigh, 2 through the leg, and 2 were Syme's. Ten out of the 11 healed soundly either after immediate suture or after closure of the flaps on the third or fourth day. One failed to unite, and suppurated.

Another very satisfactory result is that the whole of the patients have, so far, recovered whose wounds were sutured at the observation hospital. There has as yet been no death in the 175 patients operated upon for suture, whether the latter was successful or not. They are not all sufficiently recovered to be free from danger at the present moment; some have been too recently operated upon, therefore, for their cases to be included in the figures I have quoted. But, apart altogether from the question of primary union, it is a very important fact that no one has yet died. Yet many of these men were very badly injured. More than 40 of the 175 had fractured bones; 2 of them had torn femoral arteries (but have kept their limbs after ligature of the vessel); 2 had torn posterior tibial arteries; 8 had wounds opening the knee-joint, in one of which the patella had to be excised; several had fractures opening the elbow-joint; more than 20 had multiple injuries; 2 of them required transfusion of blood. I do not believe that all these men would have recovered if their wounds had not been closed.

Ample Man Power Essential.

I have pointed out the chief essentials for the success of primary suture, but the application of this treatment must remain largely a question of man power from first to last.

First, it is only by having enough stretcher-bearers that we can get in the wounded who cannot walk, and, one must add, enough *strong* stretcher-bearers. If men are not brought in "soon" their wounds cannot be sutured, so it is really a race against time and against the microbic infection, which has got the start of both stretcher-bearers and surgeons. Difficulties exist which, though they might not be thought of by the inexperienced, explain why men may arrive too late without anyone being to blame. Both many and strong stretcher-bearers are required, and it is difficult to provide too many. It is not clear that delay in reaching a casualty clearing station may be unavoidable.

Need for More Surgeons.

In the second place, primary suture of wounds evidently requires surgeons in proportion to the numbers of the wounded. We have already been able to operate on almost all the most serious cases at the casualty clearing stations in recent battles, and one wounded man out of about every three wounded was passed through the theatre and operated upon under an anaesthetic. The remaining two-thirds were sent to the base, and many of them were in the class of the "lightly wounded."

In future, the wounds which have been excised but not sutured at the front, as well as probably some not yet excised, will be dealt with by hospitals placed further back than the casualty clearing stations, and thus, if there are enough surgeons, and if wounded are not too numerous, we hope to be able to ensure that a majority of all suturable wounds shall heal *per primam*. If our expectations are realized it is evident that patients will not be so long in hospital, and that there will be less strain on staffs at the bases both in France and in England. Much depends on the incidence of the wounded and on the supply of surgeons. It is at least evident that we shall need more operators than we have had previously.

I should like here to put in a special plea for plenty of medical officers in France. I hear from various surgeons at other seats of war, and amongst them men who have served in France, that the prevalence of gas gangrene is infinitely greater in France than elsewhere. It is the danger of this which makes early operation so necessary, and it is the number of these essential operations which calls for so many surgeons.

The accompanying figures, drawn from radiograms, illustrate some cases of fracture which were treated by "primary suture."

CONCLUSIONS.

Sufficient care has now been exercised, and sufficient experience gained, to allow the primary suture of wounds to be placed on a definite footing, and to permit the following conclusions to be drawn:

1. The most important treatment is the careful cleansing of every part of the wound, and the subsequent complete excision of all dead, badly damaged, or grossly infected tissue. It is never necessary or right to remove more than a very thin edge of skin.

2. Complete asepsis is of the highest importance, and experience at the front is essential in order to select suitable cases.

3. The wound may be sutured at once, or may be left unclosed for one, two, three, or four days. It can then be sutured, with results which are identical with those obtained by immediate suture.

4. If after operation the wound is not sutured it should be dressed in such a way that it need not be disturbed till the time for closure has come.

5. If the wound is sutured at the time of operation, the patient should be retained in hospital for not less than a week. If he cannot be retained then the wound must not be sutured.

6. It is seldom that, even after the most careful operation, the wound is sterile, and bacteria can generally be found in the secretion on the following day. The presence of a few bacteria, whether anaërobes or the ordinary pyogenic forms, does not prevent healing of the wound. Streptococci which can haemolyze blood constitute the most dangerous form of infection, and if they are detected the sutures should be at once removed.

7. No definite rule can be laid down as to the lapse of time after which *suture* should not be done, but the sooner the wound can be *operated* upon the greater is the probability of success. It can be sutured later.

8. If the wound edges are found on examination to be already indurated and inflamed, or if definite gas gangrene has already commenced, the wound must not be closed. Whenever there is any doubt at all it is best to leave the wound open, knowing that it can be equally well sutured in a day or two if this appears advisable.

REFERENCE.
[1] *Lancet*, October 27th, 1917.

GUNSHOT WOUNDS OF THE ABDOMEN AT A CASUALTY CLEARING STATION.

150 CONSECUTIVE OPERATIONS FOR PENETRATING ABDOMINAL WOUNDS.

BY
CAPTAIN R. CHARLES, R.A.M.C.(T.C.).

SINCE November, 1914, I have had the opportunity of observing and treating a large number of gunshot wounds of the abdomen. I cannot lay claim to breaking fresh ground, yet in my series many of the cases present points of great interest, and illustrate the difficulties and the wide field of this type of surgery. It is not proposed to describe minutely or discuss either the various kinds of injuries produced by various missiles, or the signs and symptoms associated with the lesions of the different abdominal viscera.

DIAGNOSIS.

Difference of opinion sometimes arises as to whether a gunshot wound of the abdomen involves the peritoneal cavity or not; indeed it is sometimes impossible to tell without a laparotomy, for the signs and symptoms usually associated with these cases are not constant. Experience will usually settle the point in each particular case.

The following points taken collectively are important:

1. *Position of the Injury.*—It is first necessary to determine if possible the direction of the track. The entrance and exit wounds give an idea of the path of the missile and the structures likely to be involved. The absence of an exit wound does not necessarily mean that the foreign body is lodged in the abdomen. The possibility of its being buried in the parietes must be excluded.

2. *The facial expression* is usually one of anxiety.

3. *Pain* is not of great value, and may or may not be present. At first it is often diffuse, and afterwards becomes more localized, while the various reflected pains are occasionally complained of—a wound in the hepatic region accompanied with pain in the right shoulder; a wound in the lower costal region with pain and rigidity in the epigastrium, and that often without any involvement of the abdominal cavity.

4. *Tenderness* is a very constant and reliable sign. I do not refer to the zone of hyperaesthesia of the skin in a certain segmented area corresponding to the deep-seated injury, but to the tenderness elicited on moderate pressure over the injured viscus. It is necessary to exclude the muscular tenderness along the path of the wound and the contused area in its immediate vicinity. This tenderness will indicate the seat of the injured viscus, thus giving some idea as to what incision will best meet the requirements of the case.

5. *Rigidity*, or the absence of it, is often most misleading. I have seen a flaccid abdominal wall in a case of multiple perforations of the bowel. On the other hand, board-like rigidity is frequently met with in a purely parietal wound.

6. *The pulse* varies in rate; it increases directly with the gravity of the intraperitoneal lesion, and gives an important basis for prognosis.

7. *Vomiting* is usually present, but not necessarily. Thirst is a most distressing symptom.

X-ray localization affords the most useful guide to the diagnosis of penetrating wounds of the abdomen. Without it there must often be a large element of doubt. I always advise the radiologist to curtail his examination as far as possible, even to the neglect of foreign bodies situated

elsewhere in multiple wounding; and every effort should be made to keep the patient warm throughout the examination.

TREATMENT.

The cases on their arrival at a casualty clearing station may be classified for the purpose of treatment, according to their general condition and irrespective of the class of wound, as follows:

1. In a dying condition, when nothing can be done except to relieve pain and thirst.
2. Showing varied degrees of collapse, but capable of resuscitation.
3. In good condition and operable.

Pre-operative Treatment.

This principally consists in treatment for shock. It is usually necessary to begin by raising the body heat, and for this purpose the radiant electric bath is the best. Saline, two pints, with brandy, is given subcutaneously prior to and not during operation, as formerly practised. For extreme cases intravenous saline with 3 per cent. sodium bicarbonate has lately been recommended, and is apparently more effective. If pain is present to any extent morphine is given; rest and absolute quietness are essential.

When to Operate.

In my opinion operation should not be undertaken before the patient has recovered from shock. Two arguments may be put forward in favour of immediate operation: (*a*) Internal haemorrhage; (*b*) danger of delay allowing peritonitis to supervene. Against these, however, it may be stated that almost every case of severe intraperitoneal haemorrhage, on its arrival at a casualty clearing station, is either in a dying condition or suffering from an extreme degree of collapse and has for the time being ceased to bleed. Except when there is only one perforation no serious infection of the peritoneum from the small intestines takes place until the lapse of about six hours from the time of being wounded. It is therefore in the best interests of the patient to delay operation pending his recovery from the initial shock before subjecting him to the further shock of operation. Indeed, in cases suffering from shock and haemorrhage I have often waited six hours or more, taking the risk of further haemorrhage, with results that have justified my delay.

Provided the patient is warm, operation is done at once. Saline is given on the table during the operation. The anaesthetic now used is warm ether and oxygen given by Shipway's apparatus.

OPERATION.

I attach great importance to the element of shock, and in operative manipulation endeavour in every way to avoid any aggravation of it. The first essential is speed; the prognosis of the case varies inversely as the length of the operation. If the operation is not completed inside one hour the prognosis is not good. To do this, very free access to the peritoneal cavity is necessary. Another difficult problem in war surgery is the maintenance of a constant warm temperature in the theatre. In winter the table should be kept warm, and draughts from doors opening direct to the open air must be avoided.

Incision.

The abdomen is opened by a paramedian or, in some cases, a transverse incision. The skin is covered with tetra towels wrung out of hot saline, and over these a sheet of oiled silk is placed. On opening the peritoneum, owing to the sudden relief of tension, in many cases bleeding commences again. It is therefore necessary to mop up any blood quickly, and to attend to the bleeding point first. A large abdominal swab is next placed into the pouch of Douglas, and a systematic search made for injuries; by this means alone maximum speed and efficiency are secured. The small intestine is examined first, and any perforation covered with gauze, clamped, and left outside the abdomen; uninjured gut is returned immediately, as far as possible. Wounds of the colon are then looked for and dealt with, or packed off and dealt with later through a separate incision if free access cannot be obtained by the original opening. In wounds of the stomach the anterior and posterior walls are examined, while those of the solid viscera can be felt.

TREATMENT OF HOLLOW VISCERA.

I have very little to add to what has already been written on this subject. When wounds of both the small and large gut are present I deal, if possible, with the large bowel first, and always discard soiled instruments and gloves before proceeding to repair the small gut. With regard to the respective advantages of the lateral and end-to-end anastomosis, I have experienced so few recoveries in these cases that I am not in a position to express a definite opinion. End-to-end union takes less time if done by a single invaginating suture, and this method obviates the need for a second layer, involving a further reduction of the lumen of the bowel.

Injuries of the colon do best if operated upon at the earliest possible moment, and as these cases are usually admitted in good condition, delay is seldom necessary for the treatment of shock. *X*-ray localization is invaluable as a guide both to diagnosis and to the subsequent transverse incision. This gives direct approach, and if the colon injury is uncomplicated the field of operation is localized; moreover, there is little handling of the small bowel or unnecessary soiling of the peritoneum, and a retroperitoneal wound can be dealt with at the same time. Colon wounds are always closed by suture if possible, and I usually risk the faecal fistula which occasionally follows suture and drainage, in preference to making an artificial anus.

WOUNDS OF THE SOLID VISCERA.

Owing to the inability of the solid organs in the abdomen to overcome sepsis, the question arises whether wounds of them ought to be treated by excision of the infected tissue and suture.

Liver.

In many of my cases the treatment has been conservative. Sometimes laparotomy has been done for progressive haemorrhage, and packing the wound with gauze. In a few cases where the missile was retained sepsis has supervened, causing death. If the missile is moderately large and when accessible, it is now removed by resecting a rib above the costal margin, usually including the wound of entrance, thereby obtaining direct approach. Certain superficial wounds allow of excision of the track, removal of the foreign body, and suture. Failing this, a thorough mechanical cleansing of the wound is carried out; a packing of gauze is inserted to stop fresh haemorrhage, and removed within twenty four to forty-eight hours; the peritoneal cavity by this time is shut off, and Carrel-Dakin treatment is substituted.

Pancreas.

Wounds of this organ often occur with other abdominal injuries, so that the pancreatic wound is overlooked. In two cases I removed the missile from the body along with lacerated tissue, and sutured it up. Drainage was obtained through the transverse mesocolon, which had been previously anchored to the anterior abdominal wall. In another case good drainage was obtained through a wound of exit directly behind.

Kidney.

For exposure, the transverse kidney incision is used. If it is found necessary to deal with an intraperitoneal lesion as well, the line of incision is extended towards the middle line in front. Complete removal of the kidney is only done for gross destruction or torn vessels. Previously, in less severe cases, where an operation was warranted either for a retained foreign body or for haemorrhage, operative procedure was confined to removal of the missile and arrest of the bleeding by packing with gauze. Lately, with a view to minimizing sepsis, I have tried a more thorough operation, where only the body of the kidney was involved. Infected and damaged kidney was excised and the renal wound sutured, with drainage down to it. This has proved more satisfactory and can be carried out in the majority of the cases, the renal vessels being compressed by a rubber-guarded clamp throughout.

CLOSURE OF THE ABDOMEN.

Having dealt with the various intraperitoneal injuries the operation is completed by removing swabs and mopping up any fluid in the abdominal cavity with gauze wrung out of hot saline. Finally the incision is closed in layers.

The question of drainage is often raised. Should it be practised at all, and if so, what are the indications? I favour drainage in certain cases. The factors which influence my decision in any particular case are, primarily, the relative infectivity of the parts injured, and secondarily, the time which has elapsed since the wound was inflicted. In wounds of the small intestine operated on within twelve hours the abdomen may be closed with safety. As regards colon wounds, whenever possible I supply free drainage, usually by rubber dam, direct to the site of suture; in my series the majority were treated in this way. Retro-peritoneal wounds of the colon are always very freely drained.

The superficial wound is excised according to indications, no attempt having been made to enter the abdomen by enlarging it, a practice I avoid if possible. When the wound is in the back it is dealt with previous to performing laparotomy, as recommended by Marshall.

ABDOMINO-THORACIC INJURIES.

It is generally accepted that gunshot wounds including both the chest and abdomen have proved fatal in the large majority of cases. This state of affairs was not improved by the active surgical treatment undertaken earlier in the war; nor did treatment on conservative lines tend to give any better results. Recently, however, a different type of operation has yielded results which have encouraged me to persist in it.

Respiratory distress is the outstanding feature on admission. It is often so severe that immediate operation is out of the question. The patient is placed in a recumbent position, morphine is given for pain and restlessness, and, when the wound in the thorax is a blowing one, a few temporary skin sutures often bring a marked relief to the breathing. Time is allowed for shock to pass off and dyspnoea to diminish before operating.

Abdomino-thoracic wounds may be classified for the purpose of treatment into four types, as follows:

(1) *Where there are separate entrance wounds in the chest and abdomen.*

Provided the chest wound is not a blowing one, the abdomen is dealt with first, and only if the condition of the patient permits is the chest wound attended to.

(2) *On the left side with the entrance wound about the level of the sixth to the eighth rib, with a high up abdominal lesion.*

A few cases of this class do well on conservative treatment, especially where a rifle bullet has gone clean through antero-posteriorly or vice versa. What probably happens is that omentum protrudes through one or two small holes in the diaphragm and, becoming adherent, acts as a plug. Unfortunately the damage is often more extensive, and some idea of this may be gauged by considering the nature and position of the missile as shown by x rays and the appearance of the chest wound. If the metal has travelled down into the lower part of the abdomen it is treated as in (1). More often, however, the abdominal injury is limited to the upper abdomen, and it is for this type of case that I use a purely transdiaphragmatic route, because (*a*) it saves time; (*b*) access to the upper abdomen is much easier than by laparotomy; and (*c*) it avoids the combined laparotomy and thoracotomy, which is highly fatal.

Operation.—The chest wound, with all infected tissue, is completely excised and enlarged backwards and forwards until about five inches of the affected rib has been removed altogether. With fresh instruments the pleura is opened widely, the haemothorax swabbed dry, and the chest cavity protected by large abdominal swabs. Having placed a self-retaining retractor in the wound, the rent in the diaphragm is found and enlarged up to four or five inches. The abdominal injury is reached in this way, and, when it has been dealt with, gloves and soiled instruments are changed, and closure of the diaphragm is accomplished by a continuous suture of chromic gut. Next, the lung is examined, and, where necessary, treated according to present-day methods. Suture of the parietal pleura may present difficulty. When it cannot be sutured completely and a large gap is left, the lung is brought up and fixed by suture to the edges of the hole. This gives an airtight closure to the cavity, and also acts as a barrier to any superficial sepsis which may subsequently develop. Closure of the wound in layers completes the operation.

(3) *On the left side, with the wound of entrance below the eighth rib.*

In this type the abdominal condition is often much more serious. Frequently the chest escapes altogether, or is so slightly injured that it can be left out of consideration, in which case the abdomen is dealt with by laparotomy. When, however, both chest and abdomen require attention, the following operation can often be employed, bearing in mind the position of the missile: The chest is opened as described under (2), and the incision carried forward on to the abdominal wall. By prolonging the wound in the diaphragm the parietal peritoneum may be opened to any required extent. The chest condition is dealt with, and the pleural cavity shut off by suture of the diaphragm to the chest wall just above the wound. The intraperitoneal injury can then be treated and the incision closed.

(4) *When the Entrance Wound is on the Right Side.*

It is usually found that the metal having penetrated the diaphragm is lodged in the liver. If operation is indicated by the condition and size of the chest wound or the retention of a large foreign body, it is practically the same as for the left side. Having opened the pleural cavity the rent in the diaphragm is then sought for and the metal removed from the liver by passing a forceps down the track. When, as frequently happens, the diaphragm is pierced near its attachment, the operation is to suture the edges of the hole in the diaphragm to the parietal pleura, and so effect direct drainage of the liver track with a completely closed pleural cavity. If injury to the abdominal viscera is suspected it is treated as in (1).

Post-operative Complications and Treatment.

Shock is the commonest and one of the most serious complications that may follow operation for penetrating abdominal wounds, and the means usually adopted to combat it are as described under pre-operative treatment, with the additional use of rectal saline, or brandy and coffee when the degree of collapse is not extreme; cases with severe shock derive very little benefit from this method as it is seldom absorbed. Much more useful is the intravenous injection of a solution of 4 per cent. sodium bicarbonate or a 2 per cent. solution of gum acacia in normal salt solution. But where the loss of blood has been severe blood transfusion is the best remedy.

The Fowler position is adopted as soon as the patient has got over the shock of operation, and for twenty-four to forty-eight hours rectal saline with glucose is given. Bland fluid is the only thing given by the mouth for the first few days. Early in the war I prescribed a purgative almost immediately after operation, but I discontinued that in favour of a glycerin enema with pituitrin hypodermically on the third day.

Dilatation of the Stomach.

This occurred in several cases; the chief symptoms were a feeling of tightness in the epigastrium, restlessness, and, in the beginning, the vomiting of a small quantity of dark brownish fluid. Relief is afforded if a stomach wash of sodium bicarbonate is done early.

Paralytic Ileus.

This condition may arise in two ways: (1) It may be nervous in origin—that is, there has been primary inhibition of the nervous mechanism in the bowel due to trauma (see Case 1 below); or (2) it may be secondary to peritonitis. The symptoms are almost identical, whatever the cause, and simulate those of progressive peritonitis.

In my earlier cases operations were done to prevent or alleviate this complication. In every instance quoted there was present some degree of peritonitis, and paralytic ileus seemed imminent. In two cases, having dealt with severe wounds of the lower part of the ileum by suture, a prophylactic anastomosis was made between the parts of the bowel above the injured area and the transverse colon. Both patients were suffering from shock at the end of the operation, and neither of them recovered. It is obvious that the operation was prolonged by the anastomosis, and in view of this delay I doubt whether I was well advised, but the prognosis in both cases was not good from the start.

In one case only, occurring in December, 1915, where the upper part of the ileum had to be sutured in nine places

over a length of three feet, a short circuit above and below the injured area was done. This case did remarkably well until the twelfth day, when peritonitis became marked in the short-circuited portion, and the patient subsequently died from general peritonitis. In deciding to perform this operation I was influenced by a desire to avoid the risk of resection.

In six others, comprising perforations sutured at various levels of the small intestine, ileostomy was performed—a large catheter or half-inch tubing was inserted several inches above the first perforation either at the original operation or secondary to it. This met with little success. I experienced great difficulty in getting the catheter to act, and when once started the intestinal drainage was very limited. Consequently the peritonitis was not stayed. Possibly the addition of a second catheter inserted below the last intestinal perforation would have given more encouraging results. Latterly, however, several bad cases of paralytic ileus have recovered, the treatment consisting of frequent gastric lavage, intramuscular injections of pituitrin, appropriate saline, and the administration of enemata as required. Morphine was not withheld.

Gas Gangrene.

In this series one case developed gas infection of the anterior abdominal wall in which the deep epigastric artery had been severed. As a precautionary measure, where the wound of the abdominal wall was extensive and had to be freely excised, the peritoneum alone was sutured and a few tension stitches of strong silk, protected by capillary tubing, were inserted. I am unable to state accurately the number of cases in which retroperitoneal sepsis—gaseous or non-gaseous—became a prominent feature, but in most of them it proved fatal. One bad case, however, recovered. In this case the gas had extended from one side to the other, lifting the peritoneum from the posterior abdominal wall. A very large incision was made, resembling that employed for exposing the ureter; infected and gangrenous muscle was removed; Carrel's tubes were placed in all directions and hourly injections of Dakin's solution given.

The following are notes on a few interesting cases.

CASE I.

Lce.-Cpl. S.; admitted February 12th, 1916. The missile had entered from behind at close range, explosive in action, carrying away a portion of the right rectus below the umbilicus; two feet of intestine lying on the abdominal wall. Bowel outside showed evidence of plastic peritonitis; four large holes in it and the mesentery torn; general condition fair. Laparotomy: Abdomen full of blood; no further bowel injury discovered; resection of two and a half feet with lateral anastomosis; abdomen closed without drainage; pulse 120. Twenty-four hours later: vomited a large amount of blackish fluid; under local anaesthesia a large catheter was inserted high up in the jejunum; stomach washed out. Second day, evening: About 5 oz. of yellowish odourless fluid came away. Third day: Catheter acting well after being syringed and siphoned with saline; patient felt and looked ever so much better. Fourth day, early morning: Catheter not draining, patient very ill indeed, looking moribund; catheter syringed out and siphoned; large quantity of foul-smelling fluid came away; improved beyond all expectation—pulse returned with good volume. This carried him through to the fourth night and he died in the morning. If the catheter was not siphoned every few hours he vomited, though very little. *Post mortem:* No evidence of peritonitis, serosa shiny, no adhesions even in pelvis or over anastomosis, bowel at and below the union collapsed—for two feet it contained a little fluid, while the last fourteen inches of the ileum was absolutely collapsed.

CASE II.

Pte. S.; admitted August 31st, 1916. Wound of entrance only, left groin; severe shock, pulse thready and of poor volume. Operation: Left paramedian incision; found twelve holes in the ileum and two in caecum, with considerable plastic peritonitis; resection of five feet with lateral anastomosis; holes in caecum sutured; foreign body removed and abdomen closed without drainage. Recovery. Base September 10th.

CASE III.

Pte. C.; admitted May 25th, 1916. Wound of entrance only, to the left and at the level of the umbilicus, omentum protruding. Operation: Right paramedian incision; enormous quantity of blood; eight holes in upper ileum, four of them necessitating a resection with end-to end union; remainder sutured, abdomen swabbed dry and closed. Recovery. Base June 18th.

CASE IV.

Pte. F.; wounded March 7th, 1916, 11.30 p.m.; admitted March 8th, 8 a.m. A rifle bullet entered in the epigastric region and emerged at a corresponding point behind. Patient cold, collapsed, and pulseless; abdomen distended, rigid, and motionless. At the end of seven hours' rest and treatment he began to rally. 5 p.m.: Pulse 150. Operation, 5.30 p.m.: Left median incision—abdomen full of blood; two holes in the liver and two in stomach, the missile having then passed through the tail of the pancreas and emerged as stated. Visceral wounds sutured, abdomen swabbed dry and closed. Exit wound enlarged and the pancreas drained from behind. March 9th, developed bronchitis. March 12th, death—acute bronchitis.

CASE V.

Private S.; wounded September 10th, 11 p.m. Cause, bayonet. Admitted 6.30 a.m. Wound of entrance only, in the left groin, deep to Poupart's ligament. Patient collapsed, pulse thready and irregular; abdomen distended, but very little rigidity or pain. After four hours' rest and warmth he improved wonderfully. Operation, 10.30 a.m.: Left paramedian incision—abdomen full of blood, external iliac vein severed, two holes in the ileum. Ligation of vein, perforations sutured, abdomen swabbed dry and closed. Recovery. Evacuated to base September 19th.

CASE VI.

Pte. A.; admitted April 10th, 1917. Entrance wound right buttock, exit below and to the left of the umbilicus. Operation: Right paramedian incision; fourteen holes in the ileum, two in caecum; eleven of them treated by suture, remainder necessitating a resection of fourteen inches with lateral anastomosis; peritonitis present; abdomen swabbed dry and closed. Recovery. Base April 22nd, 1917.

CASE VII.

Lce.-Cpl. B.; admitted March 31st, 1917. A large piece of shell fragment hit the abdominal wall, carrying away portion of the oblique muscles. Several feet of intestine lying on the abdominal wall with many perforations; a small amount of mucoid and faecal material stained the serosa of the bowel. General condition very bad, but responded well to treatment. After five hours' rest, operation. Original opening enlarged; plastic peritonitis and perforations confined to the prolapsed portion of bowel. Resection of three feet; end-to-end union by a single invaginating layer; peritoneum only closed, using a few tension stitches for the skin. Developed pneumonia. Recovery. Base April 24th, 1917.

CASE VIII.

Pte. S.; admitted April 28th, 1917. Wound of entrance only, left buttock; signs of much shock and loss of blood; pulse 130; rigidity and tenderness confined to the lower abdomen. After three and a half hours' rest, marked improvement. Operation: Left paramedian incision—abdomen full of blood; internal iliac vein perforated—clamped with forceps; one hole in ileum sutured; patient became very collapsed, so the abdomen was closed, with forceps left in position. Transfusion of blood by the sodium citrate method; left the table much improved. Four days later forceps removed. Recovery. Evacuated to base May 18th, 1917.

CASE IX.

This is one of interest, as it is the only case of recovery I have had with an abdominal patient admitted pulseless who remained so for many hours. Pte. H., wounded July 21st, 1917, 12 midnight. Shell fragment. Admitted July 22nd, 7 a.m. Entrance wound only, mid-abdomen. Complications: Penetrating wound of chest and multiple wounds of both legs. 10 a.m.: Intravenous saline with 4 per cent. sodium bicarbonate and glucose given. 1 p.m.: Pulse for the first time felt at wrist. 4 p.m.: Warmer, and much improved generally; pulse 150. 5 p.m.: Pulse of fair volume. Operation, 5.30 p.m.: Right paramedian incision—abdomen full of muco-purulent fluid; one perforation in ileum with missile lodged there; removed and hole closed; abdomen swabbed clean, and a pint of warm eusol left in it, with drainage down to pelvis; the incision closed in one layer. Subsequent treatment: Repeated stomach lavage, saline, pituitrin, etc. August 1st, second operation: Resection of rib for septic haemothorax. Evacuated to the base August 10th, in good general condition.

CASE X.

Spr. F.; admitted April 30th, 1917. Entrance wound epigastric region, no exit; in fair condition; pulse 120. Operation: Left paramedian incision—abdomen full of blood; two holes in the liver; two in stomach; coronary artery severed. Visceral wounds treated by suture, artery ligatured; foreign body removed from the body of the pancreas, lacerated tissue removed, wound sutured and drained through the transverse mesocolon; abdomen swabbed dry and closed. Developed a pancreatic fistula, which gradually got less daily. Evacuated to base May 16th, 1917.

CASE XI.

Pte. H.; admitted October 1st, 1917. Shell fragment entering left side over sixth rib in mid-axillary line, penetrating abdomen; large haemothorax; severe dyspnoea; general condition good. Operation: Trans-diaphragmatic route; five inches of rib resected after excision of wound; pleural opening enlarged and cavity swabbed dry; omentum seen protruding through rent in diaphragm—this opening freely enlarged and abdominal viscera examined. The only visceral wound was a hole in anterior stomach wall with foreign body embedded in it; treated. Diaphragm closed, wound of lung sutured, and incision closed. Recovery. Base October 12th, 1917.

CASE XII.

Pte. D.; admitted October 10th, 1917. Shell fragment; entrance wound only, over eighth rib, left side; abdomen penetrated; general condition good; severe dyspnoea. Operation: Trans-diaphragmatic route—rib resected and blood swabbed from thorax; omentum found protruding through a wound in the diaphragm, size of a half a crown—enlarged this opening and found injury to spleen and kidney; foreign body removed from kidney, the wound being excised and sutured—no treatment of spleen; diaphragm closed; sudden cardiac failure then necessitated massage of the heart, which responded immediately; operation completed. Recovery uneventful. Base October 20th.

CASE XIII.

Lce.-Cpl. W.; admitted October 15th, 1917. Entrance wound close to spine, with exit wound at tenth rib in mid-axillary line, from which omentum protruded; patient badly shocked, but apparently had not lost much blood. After four hours' rest and treatment, operation: wound of exit (with omentum) excised and enlarged forwards and backwards; rib resected; wound laid widely open; rent in diaphragm sutured to chest wall above the wound; spleen found severely lacerated and therefore removed; no other visceral lesion present; wound closed. Died suddenly twenty-six hours later, when apparently doing well.

CASE XIV.

Gnr. G.; wounded October 26th, 1917. Shell fragment. On admission same day a large blowing wound in the chest wall at the level of the ninth rib, right side; *x* rays showed a very large foreign body in the liver. Operation: Trans-diaphragmatic route—rib resected, including excision of entrance wound; pleural opening further enlarged; blood removed from pleural cavity; foreign body removed from the liver through the rent in the diaphragm; edges of rent sutured to parietal pleura; wound of liver packed with gauze surrounded with rubber dam; rest of the wound carefully stitched. Following day, gauze removed and replaced by Carrel's tube. Dakin's solution used. Recovery. Base fourteen days later.

The table shows the results of 150 consecutive operations for penetrating wounds of the abdomen. As regards mortality, shock played the largest part, peritonitis was next in importance, and pulmonary complications accounted for several deaths.

Viscus Injured.	No. of Cases.	Recoveries.	Deaths.
Small intestine only: sutured ...	28	17	11
Small intestine only: resection ...	13	4	9
Small intestine and colon (2 resections of small intestine, 1 died)	28	16	12
Small intestine, colon, and stomach	1	0	1
Small intestine, colon, and liver (1 resection)	2	0	2
Small intestine, colon, and kidney...	1	0	1
Small intestine, colon, and bladder	1	0	1
Stomach	3	0	3
Stomach and liver	6	3	3
Stomach, liver, and pancreas ...	3	1	2
Stomach, colon, and kidney	1	0	1
Colon	10	5	5
Liver	14	6	8
Liver and colon	5	1	4
Spleen (2 splenectomies; both died)	6	3	3
Spleen and diaphragm	2	1	1
Spleen and kidney	1	1	0
Abdomino-thoracic Wounds.			
Thorax and diaphragm (missile in lesser sac, no visceral lesion)	1	0	1
Thorax, diaphragm, and stomach ...	2	2	0
Thorax, diaphragm, and spleen ...	1	0	1
Thorax, diaphragm, spleen, and kidney	1	1	0
Thorax, diaphragm, and liver (lung in two cases)	4	3	1
Kidney (3 nephrectomies, 1 death) ...	9	8	1
Intraperitoneal lesion, no viscus injured	5	4	1
Total	150	76	74

I take this opportunity to express my gratitude to Surgeon-General Sir Anthony Bowlby, K.C.M.G., for his encouragement and advice throughout this period. My best thanks are due to Surgeon-General Cuthbert Wallace, C.M.G., and to Lieut.-Colonel H. Rogers, D.S.O., and Lieut.-Colonel W. D. Kelly, D.S.O., for permission to publish these cases.

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SHELL WOUND OF THE PANCREAS CAUSING PANCREATIC PSEUDO-CYST.

BY

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GUNSHOT wounds of the pancreas are less frequent, or less frequently recognized, than those of any other of the abdominal viscera, hollow or solid. The relations of the pancreas with the aorta and inferior vena cava, to say nothing of such vessels as the splenic artery and vein, are so intimate that perforation of the gland by a projectile involves the gravest risk of an immediate and fatal intraperitoneal haemorrhage, and but few cases are likely to survive the first few hours. Should a case escape this primary danger, peritonitis resulting from coincident perforation of the stomach or intestines will usually supervene, and will naturally tend to monopolize the surgeon's attention, should a laparotomy be performed.

The extensive literature concerning penetrating gunshot wounds of the abdomen that has arisen during the present war is remarkable for the rarity of cases of authenticated wounds of the pancreas. Thus Surgeon-General Cuthbert Wallace, in a total of 935 penetrating abdominal wounds, collected only 5 cases of wounds of the pancreas.[1] He remarks that there are no distinctive symptoms of these wounds, and mentions that the formation of Jordan Lloyd's pseudo-cysts, so frequent after civil contusions of the pancreas, has not been seen. Surgeon-General Sir G. H. Makins[2] states that wounds of the pancreas found during the performance of operations for intestinal injuries have usually proved fatal, while in the few cases in which apparent wounds of the pancreas have been seen at base hospitals it is difficult to exclude the possibility of a wound of the second or third part of the duodenum. He mentions one case, fatal on the eleventh day, in which *post mortem* a wound of the pancreas was found with fat necrosis of the omentum and mesentery, and two other probable cases which recovered but were not established as pancreatic lesions beyond doubt. Fraser and Drummond,[3] in a series of 300 cases of perforating wounds of the abdomen, met with one case only involving the pancreas—a rifle bullet wound through the body of the gland, where recovery followed exploration and drainage.

The case described below, in which a penetrating shell fragment gave rise to a large collection of pancreatic juice in the lesser sac of the peritoneum, is not unique, for I have been able to find one reference to a similar case, which is reported in a Hungarian journal that is not accessible.[4]

Pte. M. was admitted to High Street Military Hospital, Manchester, under my care on August 14th, 1916, with the following history: He was hit in the back by a shell fragment on July 24th, three weeks before he came under my observation. Some aching pain in the epigastrium resulted, but there were no symptoms of peritonitis, and he was evacuated rapidly to England. After six days in a central hospital in Manchester he was considered well enough to be sent to an auxiliary hospital in the country. While in that hospital the aching pain in the epigastrium persisted, and a week before he came under my care it was noticed that a swelling had appeared in the epigastrium, and that he was rapidly losing flesh.

Condition on Admission.

He was thin and pale and the tongue was foul. The temperature was 99.4° F. and the pulse 100. There was an unhealed wound of entry in the back 1 in. to the right of the eleventh dorsal spine, and no wound of exit. In the centre of the epigastrium was an obvious swelling. It was large, tense, and rounded, and extended back to the left loin. It was dull on percussion and only moderately tender.

Operation.

The case was regarded as one of subphrenic abscess involving the lesser sac of peritoneum. Accordingly, under ether, a small vertical exploratory incision was made through the left rectus below the costal margin. On opening the peritoneum

the empty stomach was found to be flattened out over the front of a greatly distended lesser sac. This exploratory wound was therefore closed, and an incision was made in the back of the left loin immediately below the twelfth rib. On opening the lesser sac by this route four or five pints of clear fluid gushed out, followed by a little pus. On digital exploration of the lesser sac a fragment of the copper band of a shell, 1 in. in length, was found lying free in the cavity, and was easily removed. The loin wound was drained.

Captain G. E. Loveday, R.A.M.C.(T.), examined a specimen of the fluid and reported that it contained both trypsin and amylopsin.

After-History.

The patient made a somewhat slow recovery, and vomited for some ten days after operation. He then improved more rapidly, and after a change to an auxiliary hospital was discharged as fit for general service.

[I am indebted to Colonel F. H. Westmacott, A.M.S., Officer Commanding 2nd Western General Hospital, for permission to record this case.]

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THE TREATMENT OF INFECTED WAR WOUNDS BY MAGNESIUM SULPHATE.

BY

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CAPTAIN W. J. TULLOCH and I have recently[1] described the treatment of infected war wounds by a concentrated solution of magnesium sulphate. In these articles we claimed as advantages for this dressing:

(*a*) Its cheapness, ease of application, and infrequent and painless renewal.

(*b*) That it is not easily absorbed and therefore gives rise to no constitutional disturbances.

(*c*) That it induces the growth of firm, compact, bright red granulations, interferes with the proteolytic activities of the discharges, and stimulates the growth of epithelium.

(*d*) That the magnesium ion has a decided inhibitory action on the growth of at least two of the organisms commonly present—namely, streptococci and *B. coli*—has also a less evident effect on the development of staphylococci, and a slightly inhibitory action on the propagation of the *B. pyocyaneus*.

General Principles of Wound Treatment.

The ideal method of wound treatment in military surgery has yet, I think, to be found, but, in order to discover it and to make it efficient, certain general principles must be considered.

1. The application must be easily carried out and readily applied.

2. Once dressed, it should be possible to leave the wound untouched for some time—that is, until the patient can receive more individual attention, or for such a period that he can be transferred from the field ambulance or casualty clearing station to a base hospital in France or England (about one to seven days).

3. Its action during this period should be continuous, and it should from the first exercise a beneficial effect upon the wound, so that on arrival at the base hospital sepsis should be either abolished or so inhibited that the health of the patient has not deteriorated, and so that further treatment may not be prolonged by dealing with conditions which were preventable.

4. As a necessary corollary to these principles it follows that all special apparatus used for flushing wounds should be abolished, thereby saving much time and labour to the members of the surgical and nursing staffs and much discomfort to the patients; special splints for the immobilization of each fracture would be unnecessary, and a return made to the simpler and more easily applied apparatus in general use for fractures, because the first dressing applied to the wound could remain untouched for several days.

Stages of Wounds.

In dealing with these wounds the two important stages through which they pass are to be borne in mind:

1. *Processes of disintegration* are set up immediately on receipt of the injury. As a result of trauma the wound passes through various stages of molar or molecular gangrene, the tissues which have had their vitality too seriously sapped die and are cast off, and in so doing they become a medium for the development and growth of organisms. Treatment applied to the wound at this stage should have as its object cleansing the wound, getting rid of the sloughs, limiting sepsis, and preventing the proteolytic activities of the wound exudate as much as possible. This stage requires attention in the field ambulances and casualty clearing stations soon after the receipt of the injury and often under disadvantageous circumstances. When large numbers are passing through the surgeon's hands and accommodation is limited it is impossible to treat them on ordinary lines so thoroughly as is desirable. All that may be possible is to apply some dressing which will protect the wounds and diminish the chances of infection until greater individual time and attention can be given to them further behind the firing line.

The important point to remember is that if this part of the treatment is not carried out early, and with great efficiency, this first stage in the process of repair will be prolonged and rendered more serious.

2. *The phenomena of repair*, which begin when the processes of disintegration have been completed. Any substance applied to wounds at this stage which may interfere with the living leucocytes and prevent their phagocytic activities is to be avoided, and only those selected which will have a prohibitive effect on the proteolytic processes, and stimulate epithelialization of the wound. When this stage has been reached the patients should have arrived at the base hospitals, where more individual attention can be given. It is now, however, rarely that patients are transferred to the hospitals in England in this state. It more commonly happens that Stage 1 in the treatment of their wounds has to be continued on their arrival, and the condition of the wounds, if not worse because of increased infection, is quite as bad as when they were inflicted some days previously; they are discharging pus freely, and bacteriological examination immediately on arrival in the hospitals in England as a rule shows that all the pyogenic organisms usually found in infected wounds are present in abundance. The treatment of war wounds, therefore, resolves itself into two stages: (1) the cleaning of the wounds, (2) the encouragement of healing.

Antiseptics, and especially pure carbolic acid, have a limited scope. They may arrest sepsis so long as the organisms have not gained an entrance into the deeper tissues—that is, they must be applied very early after the infliction of the wound; they prevent the formation of toxins, but at the same time so affect the vitality of the tissues that a further field is provided for the development of organisms for whose destruction they had been employed.

The most satisfactory method of treatment during this stage is the employment of some form of more or less constant lymph lavage, or continuous irrigation with fluids that will prevent the absorption of toxic products while not interfering with phagocytosis. It is on these lines that most of the recent treatment is based—for example, Wright's hypertonic (salt) solution, eusol, Carrel-Dakin method, etc. These methods of irrigation not only get rid of the discharge by flushing, but, what is of equal or more importance, the wound is allowed to remain open, or is enlarged to allow of the free escape of the products of disintegration and sepsis.

Magnesium Sulphate Cream.

During the past year we have been using in our wards a preparation of magnesium sulphate, made of the consistency of cream, as soon as the patients arrive in hospital. To make the conditions as closely as possible resemble those that exist in a casualty clearing station, about a hundred cases were dealt with as follows:

The dressings with which the patients arrived in hospital, most of which were applied from two to five days previously, were removed. A culture was taken by Dr. Helen Clark of the organisms—aërobic and anaërobic—present in smears from the wound, and without any preliminary cleansing of the wound itself or of surrounding parts; magnesium sulphate cream was then applied to the wound under a suitable dressing. The dressing was left untouched for from three to ten days. Bacteriological and clinical examination was then made of the discharges and

the wound. The results have been such as to encourage me to report the technique and results of this treatment.

The following cases, treated in one or other of the war hospitals in Sunderland, are typical of those submitted to this treatment.

CASE I.

J. McL.; gunshot wound of left leg, October 23rd; admitted November 6th, 1916. A large wound at the back of the calf, at the bottom of which a fracture of the tibia and fibula could be seen. This wound communicated with a smaller wound on the inner side. The temperature was 101.4° and the pulse 98. The wounds, which were dirty and discharging pus freely, were dressed with magnesium sulphate cream. On November 9th the temperature was 98.4°, and the wounds, which were then dressed, were much cleaner. On November 11th they were covered with bright red granulations. By December 4th the wounds were much smaller, the through opening had closed, and on December 20th the granulations were level with the surrounding skin.

CASE II.

J. B., aged 21; gunshot wound of left wrist. When admitted the left wrist and hand were swollen and there were two wounds, one over the lower end of the radius and the other in the palm close to the styloid process of the ulna. The edges of the first-named wound were ragged and necrotic and there was a purulent discharge. The temperature was 100.2°. *X*-ray examination showed a longitudinal fracture of the radius into the wrist-joint. The wounds were dressed with magnesium sulphate cream and an anterior splint applied. When dressed on November 15th there was a little serous discharge and the surface of the wound was covered with lymph, underneath which were healthy granulations. On November 21st the wound was covered with bright red granulations, and on January 4th, 1917, it was healed save for a sinus leading down to the necrosed bone, which was removed, under an anaesthetic, with a sharp spoon. On April 30th the wound was superficial and almost closed.

CASE III.

H.; gunshot wound of foot, October 22nd, 1916; admitted November 1st, with a lacerated wound midway between the two malleoli over the dorsum of the foot, extending inwards and downwards towards the scaphoid bone. The wound was discharging pus freely and the surrounding skin was swollen and red. Bubbles escaped on pressing the edges slightly. Bacteriological examination of the pus by Dr. Helen Clark showed *B. perfringens*, staphylococci, streptococci, and Gram-negative bacilli. *X*-ray examination showed a large foreign body in the scaphoid bone which was easily removed under a general anaesthetic. The cavity was cleaned with methylated spirit and dry gauze, and filled and dressed with magnesium sulphate cream. When dressed on November 11th it looked healthy, and the magnesium sulphate cream was reapplied. On November 20th there were only two granulating spots, and the wound, which had almost healed, was dressed with boric ointment.

CASE IV.

P.; gunshot wound of right foot, October 21st, 1916; admitted November 1st. The skin over the lower third of the leg was red and brawny and discoloured as high as the knee. There were two incisions about five inches long on the dorsum of the foot, and another along its outer border, which seemed to be an enlargement of an original wound in front of the external malleolus, which was packed with gauze. Behind the external malleolus was a deep lacerated wound with a small drainage tube. There was a copious discharge of foul pus from the wound track below and in front of the malleolus. There were two longitudinal incisions, one on each side, in front of the ankle and in front of the lower part of the leg. Bacteriological examination of the pus showed streptococci, staphylococci, and *B. coli*. *X*-ray examination showed a fracture of the astragalus and a foreign body lying in or internal to the bone. Under a general anaesthetic the wounds were cleaned, the foreign body removed, and the foot and leg dressed with magnesium sulphate cream. When dressed for the first time, seven days later, the incised wounds were all looking healthy, but there was sloughing of the edges of the original wound and a good deal of sero-purulent discharge. On November 15th the wounds were all looking clean and were dressed again with magnesium sulphate cream. A superficial abscess on the outer side of the leg in its lower third was opened on November 22nd, mopped with dry gauze, and filled with magnesium sulphate cream. On December 20th an abscess was opened on the inner side of the foot and about 3 oz. of pus evacuated. The cavity was found to communicate under the tendo Achillis with the wound just behind the external malleolus. It was mopped out with dry gauze and filled with magnesium sulphate cream and closed with silkworm gut. When dressed on January 1st, 1917, the wound looked healthy, and on January 12th all wounds on the outer side of the foot and leg were healed. Those on the inner side were closing rapidly. On January 22nd all wounds were healed.

CASE V.

G. R., aged 44; gunshot wound of right knee, April 9th, 1917. When he came under my care, on May 12th, the evening temperature varied between 102° and 104°, and he was complaining of great pain in the knee and sleeplessness. There were two through-and-through wounds on each side of the patella and two incised wounds above into each side of the subcrural pouch. In each wound there was a drainage tube. On that day, under a general anaesthetic, a horseshoe incision was made round the patella dividing the ligamentum patellae. On opening the joint pus gushed out. The knee was bent to its full extent, washed out with ether, and filled with magnesium sulphate cream. Plentiful dressings of cotton-wool and sphagnum moss were applied. The wound was dressed every third day with magnesium sulphate cream until the 25th, when, his temperature having been normal for three days and the discharge having ceased to be purulent, the patient was again placed under an anaesthetic; the joint was then washed out with methylated spirit and bipped. The entire wound was sutured, the ligaments, including the patella, with catgut, and the skin with silkworm gut. The patient's progress was uninterrupted, and he was discharged from the infirmary on September 14th, 1917, with his knee-joint movable about 15 degrees, and he was able to bear his full weight on the leg.

CASE VI.

C. L.; gunshot wound of back, October 28th. When admitted, on November 6th, 1916, there was a large gaping wound about six inches long over the left scapula, dividing the latissimus dorsi and partially the infraspinatus muscles. It was dirty and discharging pus freely. Magnesium sulphate cream was applied without previous washing of the wound. On November 12th, under an anaesthetic, the wound and surrounding skin were cleansed with petrol, the edges of the wound excised, and the refreshed margins undermined and brought together with silkworm gut passed through pieces of drainage tube after the cavity had been filled with magnesium sulphate cream. When dressed, five days later, the wound looked healthy and the discharge was serous. On November 24th, when the sutures were removed, there was very little gaping and healthy granulations covered the linear margins. On December 18th the wound was soundly healed and the movements of the arm were good.

Preparation of Magnesium Sulphate Cream.

The cream is prepared in the following manner:

1.5 lb. of magnes. sulph. exsiccatum are mixed with 11 oz. of glycerin acid. carbolic. (1 to 10). The dried magnesium sulphate is in the form of a fine white powder, which contains 12 per cent. less water than the ordinary. The glycerin acidi carbolici is put in a hot mortar and the sulphate added, slowly stirring and mixing with a warm pestle all the time. The result is a thick white cream, so hygroscopic that if exposed to the air it rapidly absorbs moisture and becomes fluid. It must be preserved in a covered jar. The carbolic acid was first added for its analgesic properties, as it was thought that this application without it would be painful. We have found this precaution to be unnecessary, as the only discomfort of which the patients complain when carbolic is not present is that the cream feels cold for a short time after its application.

The wound is packed and thickly covered with the cream, and the dressing of gauze and cotton-wool is left unchanged for from three to eight days. A profuse discharge of serum takes place, so that more wool may have to be applied over and around the original dressing. On removing the dressings, any discharge there may be is sero-purulent, escapes easily, and the wound surface is covered with bright red granulations, filmed over by a thin layer of greyish lymph containing a few pus cells. A similar dressing is again applied spread thickly on gauze. In the case of deeper wounds, such as fractures, the cream is syringed into the deepest part of the wound by passing a piece of drainage tube attached to the syringe into it, and filling the wound with cream. More cream spread on gauze is applied to the surface of the wound.

After a few dressings in this manner, in the case of superficial wounds, a bright red granulating surface presents, covered by a greyish film of lymph. The dressing is now changed to magnesium sulphate solution for a few days, when the edges of the wound are either brought together with sutures, or skin grafts are applied under local anaesthesia.

In deeper wounds where a fracture is also present, after three or four applications of the cream, at intervals of three to four days, the patient is anaesthetized, the wound is freely opened up, loose pieces of bone are removed, it is washed out with ether or petrol, then dried with gauze mops and smeared thoroughly with bipp or X.Y.Z. paste.* The deeper layers of the wound are brought together with catgut sutures, and the skin edges with retention sutures of double bipped silk passed about 1 in. from the margin and tied over a dossil of gauze on each side spread with one or other paste. In some cases, before the sutures are tied, the cavity is filled with magnesium sulphate cream. The sutures prevent a too rapid escape of the magnesium sulphate cream by osmosis.

The guides to closure of the wound are bacteriological findings of the discharge and the amount and clinical

* Xeroform (bismuth tribromophenol), hydrarg. ammon., of each equal parts; paraffin. liq., to make a paste.

nature of it. As soon as the bacteriologist reports a marked diminution in the number and character of the organisms present, and we find an almost complete absence of purulent discharge, the wound is closed. Bacteriological examination of the discharges is made from each dressing when it is removed, and I am indebted to Dr. Helen Clark, bacteriologist to the Northumberland War Hospital, for her valuable assistance and help in this matter.

In a previous paper on magnesium sulphate solution it was claimed that this dressing produced firm, compact granulations, and also that rapid epithelialization of the wound took place under it. There is no doubt that under the concentrated magnesium sulphate cream the granulations are not so vascular and firm as with the concentrated watery solution, and moreover are covered by a layer of lymph, and that the epithelium from the edges of the wound does not close in so rapidly. This is what would be expected in an application which has so powerful an influence in controlling sepsis. Abscesses, if opened by a small incision, their pus contents evacuated, and cavity mopped out with gauze, filled with magnesium sulphate cream, and closed by sutures, generally heal with one or two dressings. Wounds, however, especially those of long standing, that have become sluggish do heal up under it. As would be expected in the presence of a preparation whose main claim is the production of profuse lymph lavage, those wounds do best which have no dependent counter-opening and which can be filled with the cream.

Conclusions.

Magnesium sulphate cream presents the following advantages:

1. Simplicity of application and the rapidity with which large numbers of cases can be dealt with—as in field ambulances and casualty clearing stations.
2. The infrequency of dressings, which even in the most septic cases need no change from three to eight days.
3. The combined osmotic action and the inhibitory effect on the growth and development of such ordinary organisms as are usually found in wounds—aërobic and anaërobic—together with its non-toxic action on the patient, make this a valuable dressing in the first stage of wound treatment, where the aim is to get rid of sphacelated tissue and minimize sepsis.
4. Its sphere of action as a rule ceases after the first stage, because epithelialization is inhibited and granulation tissue formation delayed as soon as the wound has been cleansed.
5. In the second stage of wound healing, that is, the encouragement of repair, other remedies should be employed, though it is useful with chronic sinuses or wounds which require stimulating.

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POST-OPERATIVE THROMBOSIS AND EMBOLISM.

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IN a discussion some years ago at the Royal Medical and Chirurgical Society, upon the complications following appendicectomy, I called attention to a possible cause of embolism, and suggested a remedy. In view of the interesting communication from Dr. McCann (March 9th, p. 277) it may be worth while to recall some of the observations.

All will agree with the sound conclusions as to technique enforced by Dr. McCann, and it is, I expect, to improvements in this regard rather than to any detail in ligature that the diminished incidence of the complication is to be attributed. Once sepsis has begun, its spread would be encouraged by bruised tissue, which is a soil favourable to the growth of bacteria. Herein lies, I take it, the truth of Dr. McCann's theory. Careless division of vessels, leaving parts poorly nourished, will determine extension of sepsis in an amputation, but in this, as in the special field alluded to by Dr. McCann, the primary step is a certain degree of sepsis introduced at the operation. That this may be an auto-infection cannot be altogether denied, and the experiments on *bistournage** by Chevalier give support to Dr. McCann's views. It will be remembered that, while a mild illness occurred in rams inoculated but not injured, those in which the spermatic cord was twisted all had gangrene at the site of injury and all died.

It is only on such a basis that we can explain the many cases of local phlegmon, of all degrees of intensity; the acute periostitis in young people resulting from a slight injury; and the acute psoitis following a strain. It is an injury that determines a joint infection in septicaemia. During this war acute suppuration of the knee has been seen to follow the manipulation required to deal with a septic compound fracture of the femur, and again of the ankle-joint under similar conditions. One of the most tragic cases coming under my notice was that of a surgeon who had scratched his finger while operating on a septic case. The injured part healed in two or three days, and he was apparently quite well and discharging his duties. He reached up to pluck a flower, and felt a "rick" in his "shoulder"—that is, vaguely; it might have been in one of the muscles. Four hours later he had a rigor, and an acute phlegmon developed in the pectoralis minor, from which he nearly died. This was a true replica of Chevalier's experiment.

If there be these acute auto-infections, so there are the milder varieties, and however perfect our technique may be, it must occasionally happen that we operate upon a patient in apparent health, yet in whom a septic infection of the blood is present. So long as the infective agent is within the endothelial-lined vessels the individual is protected, and the blood ultimately deals with and destroys the bacteria or neutralizes the products of bacterial life. Once this endothelial barrier is broken, as in the instance above related, by a rupture of muscle fibre, the infective agent escapes, and multiplies in the bruised tissue, the small blood clot, and the unprotected normal tissues. While we must be very careful in admitting such an explanation—one altogether too comfortable to the surgeon—we cannot exclude the possibility of such an occurrence. The practice adopted by many of having the patient in bed and under observation for a few days before operation is a wise precaution, and fully justified in the light of such events.

It remains to consider whether we can adopt any means of limiting the extension of the thrombosis. The disaster has occurred chiefly where primary union has taken place, and where none of the ordinary clinical evidence of sepsis has been manifest. It is, however, just in mild phlebitis that the detachable clot is formed. Where a vigorous sepsis occurs, with even double thrombosis and oedema of the legs, the clot is adherent and not likely to be detached. Looking back on the course of a case where uninterrupted recovery has followed, say, a simple appendicectomy, with no disturbance of temperature or pulse worth recording, small changes in the general condition of the patient will be recalled. There has not been the romping recovery, the subnormal temperature, the strong relish for food, the alert mental outlook one is accustomed to see. Small evidences of a disordered organism may be recalled, too slight to be recorded by the thermometer, or to affect a change in pulse rate. The pulse lacks tension, the blood pressure is probably low, sleep is not sound and prolonged, the mind is easily tired, and other small departures from the normal can be recorded. Finally, the patient is moved to a sofa or sits up, and then the oedema of the foot and ankle is discovered. At one time I made it a rule to examine the upper part of the thigh, where oedema shows itself in the recumbent position, before allowing the patient to get up. More than once it has been present. It is well to do this when the slight symptoms mentioned are present in a case where the wound runs a normal course.

It is a common observation that post-operative pulmonary embolism is seen only in connexion with operations on the abdomen. The inguinal canal and scrotum, as well as the rectum, must be included in this region. After an operation for inguinal hernia in a lady, a severe embolic attack occurred, through which she struggled for twelve hours, with great dyspnoea, cardiac pain, and cyanosis. A second attack followed the next day, and from this she also recovered. After a radical cure for

* That is, sterilization by torsion of the spermatic cord.

hydrocele in a young man, there occurred the most severe attack I have seen ending by recovery. He was unconscious for several hours, with a flickering pulse and cyanosis. This patient had been about the ward for some days.

Has anyone seen a case occur after an operation above the diaphragm? Here much tissue is often included in the ligature, sepsis is common as in breast cases, and is inevitable in operations for removal of the tongue. Nor has the complication, I believe, been recorded in children after any kind of operation. The common feature in these two conditions is free movement. It is impossible to keep a child quiet: he will move his legs about, and turn on his side after an operation for acute appendicitis. It is in movement, I believe, that safety lies.

It is the common practice to adopt the dorsal position, with knee-pillow, after abdominal operations, and also after parturition. Looking upon this position as tending to slow the current, as possibly determining thrombosis, or at any rate its extension, I abandoned the method in all but grave cases of suppurative peritonitis. For many years no case of embolism has occurred in my practice, and this I have attributed to the free movement permitted. If the knee-pillow is not begun the patient never knows of the luxury; it is a luxury, and moreover encourages complete rest. Then the hips and knees are moved three times a day, and the patient is encouraged to turn on his side as soon as possible. He is made to lie quite flat in the bed for part of each day. Nurses looked horrified fifteen years or more ago when these directions were given, and even now it is difficult to get rid of the knee-pillow.

Is it necessary to keep the parturient woman on her back for days together? From my experience, after abdominal operations I am inclined to think early movement of the limbs and frequent changes of position would diminish the number of cases of embolism. The suggestion that movement of the body interferes with the success of abdominal operations of any kind, is disposed of by the fact that vigorous vomiting even for a couple of days seems to have no injurious effects, and no ordinary movements can produce as much disturbance of the parts as vomiting. It was this observation, indeed, that led me to abandon a recumbent position of the rigid sort.

Nor can the mere size of the veins explain the thrombosis and embolism. In the neck the internal jugular can be divided and ligatured with impunity. It is often exposed in septic areas, as are the large facial and lingual veins, and yet only once have I seen thrombosis extend into the subclavian, and that was because, after an extensive dissection for glands, I left the vein instead of resecting it. That the anatomical condition of the veins has probably a good deal to do with the occurrence is no doubt true. The veins are unsupported by muscle, and this mechanical check to extension is absent.

Again, the smaller veins running a straight course enter directly into large vessels, as, for example, the spermatic into the renal, and the infected clot is swept away by the strong current.

Summary.

1. Pulmonary embolism does not occur after operation above the diaphragm.
2. Nor in children.
3. The common factor in the after-treatment of these two examples is freedom of movement.
4. Usually after abdominal operations movement is restricted, the dorsal position is enforced, and the knee-pillow adopted.
5. It is suggested that this practice determines massive thrombosis by slowing circulation.
6. It is suggested that the above restrictions should be abandoned, together with the knee-pillow, and daily movement insisted upon.

THE faculties and schools of medicine in France had a total number of 10,045 students in 1914. In 1915 the number had fallen to 2,944, rising again to 3,263 in 1916 and to 3,375 in 1917. There were therefore 6,640 fewer in 1917 than in 1914. In 1914 there were 1,088 women students. In 1915 the number fell to 772, and in 1916 to 765, rising again to 822 in 1917. There were therefore 266 fewer women studying medicine in France than in 1914. In 1914 there were 1,421 foreign students. In 1915 the number was 625; in 1916, 539; and in 1917, 515.

Reports of Societies.

WAR NEUROSES.

Cinematograph Demonstration.

AT a meeting of the Section of Neurology of the Royal Society of Medicine on March 12th, the President, Dr. R. PERCY SMITH, being in the chair, Major A. F. HURST, M.D., F.R.C.P., R.A.M.C., gave a cinematograph demonstration illustrating the essentials of treatment of soldiers and discharged soldiers suffering from functional nervous disorders. The series of films shown had been taken during the last nine months at the Royal Victoria Hospital, Netley, under the auspices of the Medical Research Committee, in order that a permanent record of some of the remarkable neuroses which had developed in soldiers should be obtained to form a part of the medical history of the war. At the same time they illustrated the development of methods of treatment pursued. A year ago the workers were satisfied if they taught a man admitted for hysterical paraplegia, which had already persisted for several months, to get about within a day or two of admission, but they realized that he would require several weeks of further treatment by re-education before he could walk normally. Increased experien e had given them greater confidence, and they were now disappointed if they did not cure all cases of hysterical paralysis, contractures, speech defects, such as mutism, aphonia, and even stammering, and the tremors and tics, which were formerly regarded as incapable of rapid recovery, within twenty-four hours of admission, however long the symptoms had persisted before the men reached Netley. This was demonstrated in the slow but steady progress shown by the cinematographs of the early cases contrasted with the more recent films, which afforded actual records of complete recovery, in the course of an hour, from hysterical paraplegia which had lasted for several months. The one essential for success in dealing with hysterical cases was complete mutual confidence of patient and medical officer. From the moment the former entered the hospital he was made to realize that he would quickly get well. Hypnotism was no longer used, and very rarely such adjuncts of suggestion as electricity or etherization; the medical officers contented themselves with vigorous persuasion and manipulation, being convinced that it was greatly to the patient's advantage that he should feel that he had taken an intelligent part in his own cure and that there was nothing mysterious about the proceedings. The opinion was expressed that the men should be admitted direct from France into special country hospitals, with special medical officers, who knew how to create a true atmosphere of cure. Here, along with the neurasthenics and psychasthenics, they would quickly recover, by being given, when convalescent, healthy and interesting outdoor employment, instead of lounging about the wards and corridors of large general hospitals with no opportunity of taking exercise except in the streets. Most would eventually return to military duty, whilst the remainder would be discharged from the service after a few weeks or months, but never before they had recovered sufficiently to earn a living in some civil occupation of national importance.

Discussion.

Dr. E. G. FEARNSIDES said that there was no single system which might not be affected by a functional nervous disorder. The commonest mistakes were those in which diagnosis referred to muscles, nerves, joints, and the extremities, such as "myalgia," "rheumatism," "lumbago," "sciatica," "neuritis," "rheumatoid or osteo- arthritis," "trench feet," and "frost-bite." In many cases diagnoses of affections of the alimentary tract or pulmonary system were attached to patients whose real trouble was of psychical origin. The majority of patients diagnosed as suffering from "D.A.H." would be benefited by special treatment directed to the psycho-neurological aspect of their disabilities. Cases in which the diagnosis of organic diseases of the central or peripheral nervous system was made were much less frequent. Schemes for the distribution of soldiers or pensioners in houses, with isolated families, were impracticable, owing to the size of the problem; and, moreover, in such houses there was no

atmosphere of cure. Special hospitals were necessary, but under military conditions a man must be either doing military work of some kind or be in hospital, yet no person who had broken down with a functional nervous disorder was fit on the day he left secluded ward life to meet the difficulties of the everyday life of the soldier; the hospitals, therefore, must have grounds for treatment in the stages between hospital and duty. As patients might show evidence of disorder of other portions of the body, the hospital should not be too far from experts in other classes of disease and injury, nor too distant from a general military or large civil hospital. Military hospitals should be near a railway station or there would be difficulties in transport and conveyance both for patients and consulting staff. There were two great groups of these cases: (1) The passive suggestible hysteric who had shrunk into himself and developed fixed, circumscribed, obvious objective difficulties, and was usually best dealt with by a *force majeure* sent in as a stimulus from the external environment; and (2) the restless, discontented, hypersensitive psycho-neurasthenic, with his much less easily comprehended subjective worries, fears, and bothers, ego-centric and yet expansive when approached sympathetically, who, if treated in the manner adequate in the hysteric would not only not be cured, but rendered wellnigh incurable. Occupation of a useful kind was essential, such as needlework, matmaking, wood-carving for bed patients; for those who could go about, training in some occupation likely to be of use in after-life had provided the most stable recoveries. Instruction in workshops was a necessary part of treatment in those who were not returning to the fighting ranks, but for those whose civil and military work would in the future be out of doors work on the land should be provided. Entertainments, especially those with a competitive element in which the patients took part, generally increased the rate of recovery. Physical drill and gymnastic displays were useful. Much depended upon the training and previous experience of the medical officer. He must know each patient and must not have too many on his hands. In general, fifty patients would be a maximum. Modified psycho-analysis was useful; dreams might be helpful in diagnosis and in elucidating the divers problems of psychological origin with which the patient was faced. Suggestion of some sort was essential, whether used through strong faradism, by personal contact, or during hypnosis. Massage, electricity (high frequency, faradism, static breeze, etc.), baths (sinusoidal, *eau courant*, hot and cold douches, etc.), radiant heat, remedial exercises, gymnastic exercises, and physical training, were useful but secondary adjuncts. It would be well that the military authorities should establish near the special hospitals repairing dépôts for the A.O.D., the A.S.C., the A.S.C.M.T., and R.E.'s, where the working capacity of men in special hospitals might be put to immediate useful national military work. At the same time such dépôts would be a means of training soldiers suffering from functional nervous disorder before transference to these specialist branches of the army. Dr. Fearnsides gave an analysis of results of treatment at the Home of Recovery, Golders Green, for the five months between October 1st, 1917, and February 28th, 1918. The number of discharges was 186. Of these 24 were medically unsuitable, 12 resented treatment, 3 left for good family reasons, and 4 were disciplinary discharges, a total of 43. Of the remaining 143, 4 practically attained pre-war standard, 39 were fit for work, 53 returned to former employment, 33 went to new work, and 14 went to further training.

Captain E. D. Adrian, R.A.M.C., said that when considering treatment the psycho-neurasthenic must be regarded as a type apart from the hysteric. Of 1,000 patients who had passed through his hands at Aldershot, 70 per cent. had been psycho-neurasthenics. These men as a class were far more difficult to treat, and for them treatment had to be more protracted.

Dr. J. Charlton Briscoe said that after discharge from military service the men should be followed up and given an inducement to work; at the time of their discharge from Golders Green most were not fit for full employment, but many had been interested in the employments offered there, and had applied for further training in carpentry, engineering, etc. When a man left institutional life he should at once go back to active employment. Some scheme to ensure this happening in the case of every single individual patient was necessary.

Sir R. Armstrong-Jones, Dr. Henry Head, and Sir James Fowler also spoke, and Major Hurst, in reply to various questions, said that under favourable conditions about 50 per cent. of the patients could return to military duty, and at the time of discharge the other half were fit to earn their living in ordinary civil life. There was a great need for some scheme by which patients could be given work directly they left hospital. Of the types he had seen at Netley the hysterics were the easier to treat; they formed about the same proportion as at Aldershot. More medical officers were required, and kindness and sympathy were needed. The medical officer must be the patient's friend. Some means should be devised to prevent patients, before appearing at medical boards, being subjected to long and tiring journeys, or they would then seem much more incapacitated for work than they really were. It was desirable that the medical officer who had treated a patient should be a member of any board appointed to estimate incapacity.

Reviews.

MALARIA IN MACEDONIA.

Two medical officers—Major W. G. Willoughby, R.A.M.C., T.F. (M.O.H. Eastbourne), and Captain Louis Cassidy, R.A.M.C.—who have been serving in Macedonia, have produced a book, entitled *Antimalaria Work in Macedonia among British Troops*,[1] which, small as it is, is likely to become a classic in the literature of malaria, for, although later editions may appear, this first issue, as giving the point of view of men actually facing the difficulties during the first two years in Macedonia, will always retain historical value. We may say at once that the book is a very complete little treatise on the mode of dissemination of malaria, and of the measures which can be taken with an army in the field for its prevention. As such it will be of immense value to military medical officers who serve in malarious countries; and not to them alone, for it puts the matter so clearly and simply, but yet fully, that it will serve as a useful *vade mecum* to officers of combatant units, of the Royal Engineers, and of the Army Service Corps.

The natural characteristics of the part of Macedonia occupied by British troops conduce to malaria. At the foot of the mountains, which are traversed by many ravines and valleys, there are large plains through which the water from the hills finds its way to lakes and to the sea In the ravines the watercourses, overhung with vegetation, are narrow, with frequent rocky pools, in which mosquito larvae are found. Moreover, in the dry season some of these streams may become very scanty, with many side pools for which there is no natural drainage. In the plains during the hot malaria months the stream-beds are only partially filled with water, leaving pools and patches of stagnant water generally full of weeds and many weedy shallows. In addition there are lakes with large surrounding patches of marshy ground overgrown with rushes and reeds. There are also many village springs, and where the flow is constant all the year round the overflow forms semi-stagnant waterlogged areas. Wells are less common, but they also are infested with larvae. Owing to these natural characteristics of the country and to the great heat of the summer, mosquitos, both *culex* and *anopheles*, have no difficulty in maintaining themselves. The native inhabitants are probably all more or less carriers of the parasite, so that the mosquito has easy work in transmitting malaria. Its opportunities have been greatly increased by the large number of soldiers who suffered from the disease during 1916.

Attention is directed to the need for destroying the adult insect, both when hibernating and during the summer, when it infests the vegetation on the borders of streams and lakes, and also in buildings and dug-outs. For the destruction of mosquitos in such places fumigation

[1] *Antimalaria Work in Macedonia among British Troops.* By W. G. Willoughby, M.D., Major R.A.M.C.(T.F.), and Louis Cassidy, M.B., Captain R.A.M.C. 1918. London: H. K. Lewis. (Crown 8vo, pp. 68. Price 3s. 6d. net.)

with sulphur (1 lb. to 500 cubic ft. of space), the burning of cresol, and spraying with 1 per cent. solution of formalin are advised. It seems certain that when precautions are neglected many men become infected in the dug-outs. The main attack must, of course, be on the larval stage, which lasts seven to ten days. Large lake marshes are extremely difficult to deal with, but something may be done by reducing the amount of vegetation and by oiling the parts near the shore where the larvae are mostly found. Pools and marshy ground left by the summer dwindling of rivers in the plains can be dealt with by digging drainage channels, but in the rocky bed of a torrent special difficulties are encountered. An instance is recorded in which a pond, a fertile source of mosquitos, was situated in marshy ground but itself in a saucer-like depression in the rock, which could not be drained without much blasting and was too large to be filled in. A 6-in. iron pipe siphon was fixed and the level of the water reduced by 4 ft., thus lessening the area of water to be treated with oil. Constant supervision is required, and the patrols should be trustworthy and intelligent men who can be depended upon to carry out instructions and to report defects.

When all is done the whole area occupied by troops cannot be rendered free from mosquitos and their larvae in the time and with the means at disposal, and consequently personal prophylaxis is necessary. Here the chief implement is the mosquito net, but it is useless unless kept in good repair and properly adjusted each night. Face nets are also recommended, but it appears to be difficult to get the nets, and afterwards to induce the men to use them properly. The prophylactic value of quinine in the doses given has proved incomplete and questionable. Men receiving at least ten grains of quinine sulphate in solution twice a week, and often up to ten grains daily for a long period, have been taken ill with malaria, primary and recurrent. The conclusion is that while quinine prophylaxis should still be employed, especially where other precautions are difficult, reliance should be placed infinitely more on the various methods of protecting men from the bite of the mosquito, of which the most effective is the elimination as far as possible of its breeding places in pools, marshes, and casual water in wells, tubs, and hoof prints.

NOTES ON BOOKS.

DR. CAMPBELL MACFIE'S brightly written book, *The Art of Keeping Well*,[2] is intended for the general public, and contains many common-sense maxims, especially as regards diet and exercise, set forth with a wealth of apt illustration. The author, who has had much experience in sanatorium work, insists that no ventilation is good unless it creates a perceptible movement of air or breeze to stimulate the skin. In some practical remarks on sleep many readers will be glad to find that there is no hygienic or moral merit in early rising, and they should take to heart the further statement that in children it may impair the growth both of body and mind. As an example of the author's happy knack of epigram, his dictum that probably the two main causes of constipation are unpunctuality and pills may be quoted. Like most books this one shows the influence of war conditions in some of the analogies, and in a reference to the erroneous belief that war bread is indigestible.

MM. COPPEZ and VAN LINT have written for nurses an eminently readable and very useful little book[3] on the care of the eyes. Especially worthy of note is the profusion of illustrations, admirable reproductions of actual photographs. The first part of the book deals with the anatomy and examination of the eye, the second part with such matters as lavage, bandages, shades and goggles, lotions and drops, electrotherapy, ocular massage, and the application of heat and cold to the eye. The third part describes the hygiene of the sick-room, the operation room, the sterilization of instruments, and ophthalmic nursing before, during, and after the actual eye operation. The fourth part is devoted to certain special subjects, such as the nursing of purulent ophthalmia in the newborn and first aid in accidents, burns, etc. There is an excellent chapter on prosthesis, and a glossary of the various ophthalmic drugs and instruments in common use completes the volume.

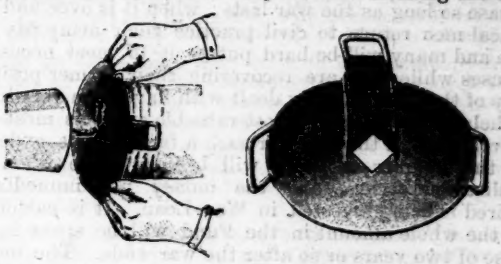
[2] *The Art of Keeping Well.* By Ronald Campbell Macfie, M.A., M.B., C.M., Honorary LL.D. Aberdeen. 1918. London: Cassell and Co., Ltd. (Pp. 244, with one colour and three half-tone plates. 6s. 8d.)

[3] *Soins Oculaires à l'Usage des Infirmières.* By H. Coppez, Agrégé à l'Université libre de Bruxelles, and A. van Lint, Chef de Service à la Policlinique de Bruxelles. Brussels: O. de Rycker and Mendel. 1916. (Cr. 8vo, pp. 186; 114 figures.)

MEDICAL AND SURGICAL APPLIANCES.

An Amputation Flap Retractor.

CAPTAIN R. BUTE MACFIE, M.B., F.R.C.S.E., R.A.M.C. (T.C.), writes: The illustrations will give an idea of the construction of this instrument which I have designed. Its main objects are to give the maximum retraction of skin and muscle flaps in amputating and the easiest access to the bone to be divided. It is easily applied by one assistant, and, when the operator is dividing the bone



the assistant's hands are well out of the way—the bone can be divided without obstruction at the desired point. The diamond-shaped opening gives ready adjustment to any size of bone, and the whole is readily sterilizable in the army pattern sterilizer. This form of retractor has been used in several hospitals in France for eighteen months and has given satisfaction in every way. It is made by Messrs. Mayer and Meltzer.

ROYAL MEDICAL BENEVOLENT FUND.

THE annual general meeting of the Fund was held on March 12th, when the officers were re-elected. Votes of thanks were passed to the Editors of the *Lancet* and BRITISH MEDICAL JOURNAL, Mr. Guy Elliston (Financial Secretary of the British Medical Association), and to the lay press.

Owing to the growth of the work, a subcommittee has been appointed to deal with cases and to report to the Committee of Management in the same manner as another subcommittee reports on annuities. Reference was made to the loss the Committee had sustained by the death of Dr. Parker Young, who had been a member for forty years, and had served the Fund with great constancy and devotion. During the year Dr. W. S. Colman, Dr. John Fawcett, Mr. Guy Elliston, and Dr. Leonard Guthrie had been elected members of the Committee, and Dr. Newton Pitt had been appointed representative of the Royal Medical Benevolent Fund upon the Professional Classes War Relief Council. The report contained an expression of the view that disputes between the Fund and Epsom College with reference to legacies should be settled amicably, and of the hope that some means of referring such matters to arbitration would be found.

War Emergency Fund.

The report contained a brief explanation of the reasons for the establishment of the War Emergency Fund. It was started in 1916, and more recently a second appeal was made, which was supported by a letter addressed to members of the Association by the President, the Chairman of Representative Meetings, the Chairman of Council, and the Treasurer (BRITISH MEDICAL JOURNAL, December 22nd, 1917, p. 842). The report pointed out that many medical men, when called up, had to leave on very short notice, without time to make adequate provision for the continuance and maintenance of their practice during their absence. As a result they had to face a severe fall in income, even when supplemented by army pay, while many expenses, such as rent, insurance, taxes, family maintenance, and education, could not be materially reduced. Although in a year or two after their return it may be hoped that those affected will recover their position, still in the interval help is and will be required, and it is to meet these needs that the War Emergency Fund was instituted. To be effective the grants must be made on a liberal scale, and the fund from which they are

to be drawn must be a large one. The appeal is for the sum of £25,000. The following statement shows the response so far made:

	£	s.	d.
First appeal (1916)	3,892	2	2
Second appeal (1917-18):			
Received £10,833 7 9	11,333	7	9
Promised 500 0 0			
Dividends	247	5	0
	15,472	14	11
The investments in National War Securities amount to...	13,500	0	0

Hitherto the cases with which it has been called upon to deal have not been numerous and the amount actually expended is small. It was anticipated that this would be the case so long as the war lasts; when it is over and the medical men return to civil practice their army pay will cease and many will be hard put to it to meet necessary expenses while they are recovering their former position. Many of the cases already dealt with have been very hard; the help given has been most valuable and has most conclusively proved the need for such a fund. It is expected that the number of cases will become large when demobilization occurs, and the money not immediately required is being invested in War Loan. It is calculated that the whole amount in the Fund will be spent in the course of two years or so after the war ends. The money received by the Fund has so far been subscribed entirely by the medical profession itself, and it is felt that an appeal should be made to a wider circle. No profession has been so hard hit by the war as the medical, and no other has been called upon, as a profession, to give its services unreservedly, though often at very great personal sacrifice. The value of the services rendered is shown by the immunity from diseases which were formerly the scourge of armies in the field and by the success of modern medical and surgical methods.

The General Fund.

The finances of the General Fund are administered in two departments—grant and annuity. The total donations and subscriptions to the grant department in 1917 amounted to £2,713, an increase of £645 over the previous year; this included a legacy of 100 guineas left by Lieut.-Colonel Leahy. The amount distributed was £2,269, including £120 in war-time gifts at Christmas. The decrease is due to the fact that twelve of the new annuitants had for long received grants from the Fund. The income of the annuity department was £2,911, or £75 less than last year, but when income tax on dividends has been refunded the total income will be about £200 more. The amount distributed was £3,221, including Christmas gifts of £1 each to the annuitants, who number 161.

THE THERAPEUTIC VALUE OF RADIUM.

THE annual report for 1917 of the London Radium Institute differs from its predecessors inasmuch as in place of any detailed account of the 603 cases treated in that year it provides summaries arranged under various heads of the conclusions drawn from the experience of the six and a half years which have elapsed since the institution was founded. During that period 40,000 treatments have been given to nearly 5,000 patients, of whom about half were suffering from malignant disease (including rodent ulcer). Each section is illustrated by cases. It was not found practicable to state the later results of all the cases treated, and as an alternative it was decided to select from the after-histories of those patients who could be traced a series of cases of cancer and of sarcoma which were apparently cured, if the test of immunity for more than three years is held to justify that term. Some such test is the only one that can be applied, and three years is the period usually accepted by surgeons. We regret that the limitation of space prevents us from giving a detailed account of all these remarkable cases, but we understand that a copy of the report will be sent, post free, to any medical practitioner who will apply to the Secretary of the Radium Institute, 16, Riding House Street, Portland Place, W. 1. The report, which is the work of Mr. A. E. Hayward Pinch, F.R.C.S., medical superintendent, who acknowledges his indebtedness to the assistant medical superintendent (Dr. J. E. A. Lynham), opens with a reminder that in judging the results recorded it must be remembered that the policy of declining to treat operable cases of malignant disease, rodent ulcer alone excepted, has been rigidly followed, save only in those instances in which patients have absolutely declined to submit to operation.

Epitheliomata.

The after-results of radium treatment of epitheliomata of small size, and affecting glabrous surfaces, when taken at an early stage and before lymphatic infection is evident, have been encouraging, and it is considered that when patients decline to submit to removal by excision the treatment may justifiably be resorted to. The results with epitheliomata of mucous membranes (mouth, tongue, fauces, or oesophagus) have been disappointing. In the mouth disappearance or fibrosis of a small primary lesion may be obtained, but sooner or later lymphatic involvement occurs. In the oesophagus definite temporary improvement may be obtained, the stricture becoming more patent, so that the patient is able to swallow solid food for six or nine months, or even longer. Some patients treated for epitheliomata of the vulva and vaginal mucosa remained apparently well for many months.

Carcinoma of the Uterus.

The larger number by far of these cases presented themselves at a stage when the disease was very far advanced, so that there could be no hope of apparent cure; but arrest of haemorrhage, diminution of discharge, healing of ulceration, lessening of induration and relief from pain, were almost invariably obtained. Some patients responded much more speedily and completely than others, but in almost every instance distinct benefit was observed, and the rate of progress of the disease greatly retarded.

CASE 1337.—A woman, aged 46, who had undergone two partial operations in September and October, 1913. She received radium treatment in December, 1913, and in January and March, 1914. The disease was arrested, and the patient rapidly regained health and strength. In January, 1918, her medical attendant reported that she was quite free from any recurrence of the carcinoma.

CASE 382.—A woman, aged 68, with extensive cervical and vaginal cancer, declared to be inoperable by the surgeon consulted. She received treatment in February, April, and October, 1913, and in March, 1914. Great local improvement ensued, and from March to the end of September, 1914, she was apparently quite well, but in October symptoms of kidney disease appeared, and she died of uraemia in January, 1916. There had been no recurrence of the local trouble.

CASE 5348.—A woman, aged 34, with inoperable carcinoma of the cervix. She was treated at intervals varying from two to six months, the last time in July, 1916. In February, 1918, her general condition was good; she had gained in weight and was equal to all her household duties. There was extensive fibrosis of the vaginal walls.

Carcinoma of the Rectum.

The results here were not constant or uniform, but in some instances growths regarded as inoperable were so much improved, their size and vascularity being so lessened and the degree of fixation so diminished, that they were removed, and the patients remained free from recurrence. This, however, has not frequently happened, and in the majority of cases the most that can be hoped is healing of ulceration, diminution of the rate of growth, checking of the haemorrhage, and postponement of the date at which colostomy becomes imperative. The best results were obtained where the growth was annular, spongy, and situate in the upper half of the rectum. The plaque-like, infiltrating growth was not found so amenable.

CASE 225.—A man, aged 70, underwent excision of the rectum for malignant disease in 1901. A recurrence in April, 1912, was excised; a second recurrence in October, 1912, was declared inoperable. He then had a hard carcinomatous ulcer immediately inside the anal opening, with much surrounding induration. He received radium treatment in October and November, 1912; the ulceration healed, and the growth was replaced by fibrous tissue, which caused stricture necessitating occasional dilatation; the patient when last seen, in January, 1918, was in good general health.

CASE 35.—A man, aged 35, received radium treatment in October, 1911, for a large ulcerated carcinomatous growth in the lower half of the rectum, declared to be inoperable. The ulceration healed, and the growth became reduced in size and much less fixed. Early in December Kraske's operation was performed, and the patient was given a course of prophylactic irradiation. He made a good recovery, and the latest information,

in February, 1917, was that he was in perfect health and leading an active and busy life.

CASE 752 is another example of malignant growth of the rectum pronounced inoperable, but after radium treatment successfully submitted to operation. He died from granular kidney and uraemia about a year later, but there was no evidence of recurrence of malignant disease.

CASE 1997 was that of a woman, aged 40, with extensive inoperable cancer of the rectum. She received radium treatment in January, April, and October, 1916, and January, May, and November, 1917. When last seen, in January, 1918, the disease was apparently quiescent, and there had been no rectal haemorrhage since the previous August.

Carcinoma of the Bladder.

Inoperable cases tolerant of intravesical applications may be advised to undergo radium treatment, as sometimes apparent cure results. Definite improvement in the symptoms is usually evident in about three weeks, and in the most favourable cases healing of the ulcer, with the transformation of the carcinomatous material into a fibrous mass, takes place.

Carcinoma of the Breast.

Cases of carcinoma of the breast form the largest class applying to the Institute; all those in which operation was at all practicable were invariably advised to submit to operation, so that those treated were nearly all in an extremely advanced state with extensive lymphatic involvement. In some instances great improvement followed radium treatment, especially in cases in which the disease was chiefly superficial, and confined to the skin of the operation area and the axillary and supraclavicular glands. Superficial ulceration unaccompanied by much subjacent induration often healed rapidly and completely after a radium exposure of eighteen to twenty-four hours. If the deeper lymphatics are involved and the lungs, or any of the abdominal viscera affected, little can be looked for beyond possible retardation of the rate of growth and the prevention of extensive ulceration. Cases of atrophic scirrhus in patients over 60 years of age may be kept in check for an almost indefinite time by radium irradiation repeated every three or four months.

CASE 1125.—A woman, aged 47, underwent in July, 1911, amputation of the right breast, with clearance of the axilla; in June, 1913, there was recurrence in the axilla. She was treated with radium during February, 1914, and by April the induration which had been present in the right axilla and in the left supraclavicular fossa had disappeared. In January, 1918, she wrote that she was better than she had been for many years.

CASE 151.—A woman, aged 64, underwent Halsted's operation in June, 1911. There was recurrence in February, 1912. She received radium treatment in March and April, 1913, and in January and March, 1914. When last examined, in April, 1917, no indication of any malignant trouble could be detected.

CASE 854.—A woman, aged 51. Right breast removed May, 1912; recurrence in scar September, 1913. She first received radium treatment in November, 1913; it was repeated in February and April, 1914. When last examined, in January, 1918, no trace of the disease could be found.

CASE 5003.—A woman, aged 48. Excision of the right breast in 1906; clearance of the axilla in 1909 for glandular recurrence; several operations for nodules, the last in 1912. In 1913 there were multiple recurrences, and a further operation was declared impracticable. She received radium treatment in January, March, and April, 1914; when last examined, in October, 1917, no trace of the disease could be detected.

Sarcoma.

The results of radium treatment of sarcoma are said to be on the whole more satisfactory than those of any other form of malignant disease, with the exception of rodent ulcer. The treatment must be vigorous, the tumours being treated whenever practicable both by the insertion of emanation tubes and by external radiation. The best and most rapid results were obtained in lympho-sarcomata; the disappearance of the tumours when the dosage was correct is said to be little short of marvellous. Sarcoma of the tonsil and post-nasal space have responded extremely well. The response of periosteal sarcoma has been good, but not so uniform, though the percentage of recurrence has been slight and cases are recorded in which the patient remained free from any manifestation of the trouble for a period of more than four years. Melanotic sarcoma usually proved unamenable, but in one case of melanotic sarcoma of the choroid and in another of the skin of the back complete disappearance of the primary growths was observed. The former case (a woman) has remained well for two years, but the latter (a male, 21) died fifteen months later from secondary deposits in the brain and lungs.

CASE 50.—A man, aged 41, treated for a large and rapidly growing recurrence of lympho-sarcoma of the neck. He received fourteen treatments from October, 1911, to January, 1912. The growth had disappeared at the end of February, and in January, 1917, the patient was seen free from recurrence, and in excellent health.

CASE 4901.—A woman, aged 32, with a large periosteal sarcoma of the right thigh, for which amputation at the hip-joint had been suggested. Microscopical examination showed that it was a spindle-celled sarcoma. She received radium treatment during February and April, 1914. Improvement was very rapid, and the patient at the date of the report was in excellent health.

CASE 567.—A woman, aged 62, with a large rapidly growing sarcoma of the clavicle. Radium treatment (June, 1913) was followed by rapid disappearance of the growth. When examined in January, 1918, there had been no recurrence.

CASE 4905.—A woman, aged 32, with rapidly growing recurrence of sarcoma of the nasopharynx. She received radium treatment in 1912, and at the last report (March, 1917) was in excellent health.

CASE 140.—A girl, aged 15, round-celled sarcoma of the superior maxilla with recurrent sarcoma following operation for a growth in the antrum. Radium treatment was begun in February, 1912; at the end of June all signs of recurrence had disappeared, and when last seen, in March, 1917, she was in excellent health.

Mediastinal Tumour.

Some remarkable results have been obtained in mediastinal tumours causing dyspnoea, venous congestion, and disturbance of the sympathetic and recurrent laryngeal nerves. It was considered probable that the majority of these growths were lympho-sarcomata, as this would account for the favourable influence that radium rays exerted upon them.

Lymphadenoma.

The response of lymphadenoma of recent origin, with enlargement of the spleen or mesenteric glands, to radium treatment may be rapid. In some cases, especially those treated in the early stages of the disease, the patients can go on for eighteen months or two years without further treatment, but the majority require the irradiation to be repeated at intervals of four to six months.

Rodent Ulcer.

Of rodent ulcer it is said that cases which have not received previous treatment with carbonic acid snow, ionization, or x rays, and in which the lesion does not exceed 3 to 4 cm. in diameter and does not implicate cartilage, bone, or mucous membrane, can almost invariably be cured by one or perhaps two exposures with powerful unscreened applicators. The tissues must be irradiated well beyond the margin as appreciable by sight or touch, and a long exposure given; otherwise recurrence will usually be noticed within twelve months. When the mucous membrane, more especially the nasal, is affected it appears almost impossible completely to eradicate the disease unless the area involved is very small. Advanced cases of old standing, with great destruction of the cheek, nose, and upper lip, involvement of the nasal mucous membrane, and perforation of the hard palate, could only be slightly benefited, but such severe cases, often seen during the first two or three years of the work of the Institute, have now become rare, probably because the efficiency of radium treatment of rodent ulcer in its early stages has been more widely recognized.

The report also contains a note upon the effect of radium in checking menorrhagia and metrorrhagia accompanying fibroid disease of the uterus. Among other conditions treated with greater or less success are to be mentioned papillomata of the bladder, lupus vulgaris and erythematosus, keloid, lichenification of the skin, pruritus, and naevi. When used in exophthalmic goitre radium may at first cause exacerbation of all the symptoms, but usually within six weeks or two months tachycardia lessens, the tremors diminish, the exophthalmos becomes less noticeable and the restlessness and irritability decrease.

British Medical Journal.

SATURDAY, MARCH 23RD, 1918.

MALARIA IN THE ARMIES.

Many districts of Macedonia are notoriously malarious. Though no detailed statistics have been published it is known that the allied armies have suffered severely and that the mosquito hosts have upset many military plans, especially in the Struma Valley. That some of the delays and failures from this cause might have been obviated had the general staffs been better acquainted with the mode of dissemination of malaria and the measures necessary for its prevention or mitigation seems to be demonstrated by the fact that very considerable improvements were obtained last year. The casualty figures have been dwarfed by those of sickness due to malaria. The season at which the disease was most prevalent was from May to October. In the British army, in one region during January, about 1 man in 1,000 was evacuated weekly to the base with malaria. The number then rose steadily, until in the third week of May about 1 in 130 (about 7.6 in 1,000) had to be evacuated; then followed a slight remission, with a sudden rise towards the end of June, the figure reaching about 1 in 55 (about 18 in 1,000) in July, and continued about the same rate until September, when there was a slight fall. In mid-September there was a sudden rise, the maximum for the year being reached in the second week of October, when the rate was 33 in 1,000. Some specially exposed units, we are told, had almost, if not absolutely, all their personnel infected at the same time, and in a few cases as much as one-third of the strength of the unit has been evacuated to hospital within a month in the height of the malaria season. These figures, we understand, refer to 1917, when the continuous antimalarial work had resulted in a considerable diminution as compared with the previous year. Some rates issued by the War Office last July,[1] referring to a period of four weeks ending on June 23rd—not covering, that is to say, the season of the severest incidence—showed that primary cases of "malaria and other fevers" were 7.79 per 1,000 a week in 1916, and 5.56 in 1917. Had the recurrences been included the rates would have been very much higher. With regard to malaria in the French army in Macedonia, we published some figures last November showing that considerable improvement had taken place, which was attributed to the attention given to the sanitation of localities, to the free distribution of mosquito nets, and to the administration of a daily dose of quinine under supervision. The rate in August was 39.16 in 1916, and 23.8 in 1917; in September it was 74.6 in 1916, and 29 in 1917; only about one-sixth of the admissions in September, 1917, were new infections.

These high rates of sickness from malaria, coupled with the severe prevalence of dysentery and diarrhoea, embarrassed military operations. General Milne stated in his dispatch[2] that when in May, 1917, it was determined not to make a general attack, he found it necessary, moved by the experience of malaria and dysentery gained in the previous year, to abandon the forward positions on the right and centre of the line and to retire to the foothills. It can hardly be doubted that the operations throughout have been hampered by the high rates of sickness.

That these misfortunes should have happened to the armies of France and Britain, the two countries which in friendly rivalry have solved the root problems of malaria—the nature of the infective agent and the mode of its dissemination—is one of those ironies of history which will lend point to the satire of some future Gibbon. The book by Major Willoughby and Captain Cassidy, reviewed elsewhere in this issue, provides ample material for judging the difficulties of the problem. The Intelligence Departments must have known that it would be impossible, having regard to the configuration and climate of Macedonia, to carry out a campaign in that country without incurring the risk of serious sickness from malaria. The country is infested with mosquitos, including several species of *Anopheles*, which find suitable breeding places not only in the marshy rivers of the plains, but in the valleys, ravines, and upland bogs of the hills. It was known, moreover, that malaria was endemic in Macedonia and that infected persons abounded among the natives. The conclusion that ought to have been drawn was that the mosquitos of the species capable of carrying the haematozoon would certainly be infested. To send large numbers of young soldiers into such a country without taking every precaution that science could suggest or experience dictate was a heinous military fault. We have no doubt that the risks were fully brought to the notice of the general officers commanding and their staffs by the respective medical departments, but there seems grounds for the belief that the full significance of these warnings was not appreciated. As the authors of the book to which we have referred say, "co-operation between officers of all branches of the army is far more satisfactory when its basis is intellectual." Were the military importance of the problem fully appreciated, executive officers would be readier to consult with medical officers expert in malaria as to camp sites where these have not to be fixed by purely military exigencies. The medical department of the army, we are told, has too little executive power in many respects; mere recommendations lead to delay. The hibernating mosquito should receive special attention in the winter and spring months, and canalization and similar work should be begun early in the year, even in March or April, as soon as the waters begin to subside. Education of officers and men of all branches should be considerably extended, for it appears that insufficient notice is too often taken of lapses of care on the part of individuals in protecting themselves and others from exposure to needless risks of mosquito bites. One instance is mentioned in which at a night visit to a camp it was found that only 6 per cent. of the men had taken the trouble to close their nets properly. "The only censure in the case of which we heard was apportioned to the officer who made the discovery for not properly notifying his visit before examining the nets of the unit." Clearly education is very much needed, and it is depressing to read that two medical officers newly arrived in Macedonia stated that attendance at lectures on malaria in their recent home R.A.M.C. training was optional. Macedonia is not the only malarious district in which the British armies are engaged. It is known that the incidence of the disease in Mesopotamia was severe, and if half of what rumour says can be believed the condition of things in East Africa is little, if at all, better.

[1] British Medical Journal, 1917, vol. ii, p. 56

The difficulties created for the army medical administration do not end when a malaria patient is invalided home. The number of men under treatment in this country has been very large, and we are afraid that no entirely satisfactory system of curing them has yet been evolved.

PROPHYLAXIS OF PNEUMOCOCCIC INFECTIONS.

THE black races are peculiarly susceptible to pneumococcic infection; among the natives of Madagascar and Senegal and the Annamites virulent septicaemia with invasion of the serous membranes is prone to occur, and this tendency is aggravated when these natives are exposed to unusual conditions of cold. Jouin[1] has been impressed, from his experience at the colonial labourers' camp at Toulon, by the frequency of sudden death among these natives during the first few days of frank pneumonia; the heart was free from any murmur, but the pulse was rapid, and the systolic blood pressure often below 100 mm. Hg. In these cases the myocardium was degenerated, pericarditis and early pneumonia were present; death was ascribed to a toxic neuritis of the cardiac nerves, against which cardiac tonics and adrenalin are recommended. In the camps at St. Raphael and Fréjus the same tendency to septicaemia was shown, and among 52 cases of acute meningitis Baujean[2] reports 22 due to primary pneumococcic infection—that is, not secondary to pneumonia; all ran a rapidly fatal course, were remarkably free from vomiting, and often showed pus in the accessory nasal sinuses; the cases occurred sporadically and not in an epidemic form. He also describes six interesting cases of pneumococcic infection of the skin, four being on the face and suggesting erysipelas with oedema and great swelling. Small bullae then appeared in successive crops, and desquamation was sometimes followed by small yellow abscesses crammed with pneumococci.

In order to protect natives sent to France in labour contingents, the South African Institute for Medical Research provided a prophylactic vaccine, and the results of this immunization appear to have been very satisfactory, although as yet official figures are not available. This was but a small part of the extensive work carried out by F. S. Lister,[3] under the South African Institute for Medical Research, on the immunization of man against pneumococcic infection, and especially of the native mine labourers against lobar pneumonia. In America Douchez and Gillespie in 1913 established four main types of pneumococci,[4] and shortly afterwards Lister began to isolate the groups in South Africa, and now refers to about a dozen, of which "A," "B," and "C" are responsible for 69 per cent. of cases of pneumonia there. It is interesting to note that group A, which is the predominant pneumococcus in the Transvaal natives, is not represented in America, and that groups "B" and "C" correspond to the American types II and I, which are the most important in the etiology of lobar pneumonia. A prophylactic vaccine of groups "A," "B," and "C" was given to large numbers of native mine labourers with most encouraging results; in the Crown mines the natives thus inoculated became absolutely immune to pneumonia due to these groups of pneumococci, though pneumonia due to these groups was prevalent among uninoculated natives in other mines. But 82 cases of pneumonia occurred in the Crown mines among the inoculated natives; they were due to groups of pneumococci, mainly "E," "H," "J," "K," which are therefore probably of sufficient epidemiological importance to warrant their inclusion in a more comprehensive vaccine for future use. These observations are obviously not only of scientific interest, but of great economic importance. Apparently the results have met with some hostile criticism, and the suggestion has been made that the fall in the incidence of pneumonia among the inoculated natives is only part of the admitted decrease of pneumonia due to general causes.

Though these criticisms have only come to our notice in Lister's controversion of their validity, it certainly appears that he has a very strong case, and in any event his labours deserve sympathetic attention. After resorting in 1912 to Sir Almroth Wright's inoculation against pneumonia in the Rand mine labourers there was a remarkable fall in the mortality from pneumonia, but at that time the pneumococcus had not been classified into distinct groups, and it is therefore impossible to say what groups were prevalent in the pneumonia or were represented in the vaccine. Lister's work, therefore, constitutes what promises to be an advance in the practical and scientific application of vaccine therapy. It would be interesting to know what strains of pneumococci are responsible for pneumonia in this country, and how future specific protection by vaccine or curative treatment by antipneumococcic vaccine will compare with the results in South Africa and in America respectively.

[1] *Bull. Soc. de Path. Exot.*, Paris, 1917, x. 774-7.
[2] Ibid., 816-827.
[3] Publications of the Institute, edited by W. Watkins-Pitchford, M.D. (No. x.) Johannesburg. 1917.
[4] BRITISH MEDICAL JOURNAL, January 12th, 1918, p. 57.

THE MINISTRY OF PENSIONS.

IN seeking an explanation of Mr. Hodge's outburst at Worcester last Sunday we turned to the report of the War Cabinet for the year 1917—a new kind of Blue Book which seems to have greatly perturbed some of the old guard of the Liberal Party. We find there a section dealing with war pensions, covering the whole history of the Ministry which came into existence on December 22nd, 1916. Two main statements are made with regard to its work. The first is that the monetary scale of pensions has been increased and the conditions attached to them widened, so as to effect a more liberal recognition of the country's debt to its defenders. The estimated expenditure for 1918 is 23 millions, and for 1919, 41 millions and a half. But we gather that Mr. Hodge is of opinion that the allocations are in some respects inadequate; that he has had a severe conflict with the Treasury on the subject; and that it is now engaging the attention of the War Cabinet. The other statement in the Blue Book is that "the principle of compensation has been reinforced by that of restoration of social and industrial efficiency," and that the Ministry is concerned with "the continuing medical treatment of the discharged man, his education and equipment as a producer, and the avoidance of any feature in its code that would set a premium upon resigned helplessness or diminish the incentives to profitable exertion." Its obligation in this respect is set out in a later sentence, where it is stated that in the matter of after-care it "has established, and is still developing, extensive safeguards both for health and efficiency." The extensive safeguards enumerated are two: the first is an extension of an arrangement made through the National Insurance Commission for dealing with discharged sailors and soldiers suffering from tuberculosis and for medical treatment of the insured man, so as to provide medical and sanatorium benefits for all such invalided soldiers and sailors, whether insured or not, but subject in the case of the uninsured to an income limit of £160 a year. It is also stated

that, in cases where "special treatment beyond the competence of an ordinary practitioner" (the phrase of the insurance regulations) is necessary, an organization has been set up whereby the services of the nearest suitable hospital are utilized, the Ministry of Pensions defraying the cost. It is claimed also for the Ministry that it has co-operated with other authorities and with the Red Cross Society in enlarging the number of institutions available for the treatment of paraplegia, neurasthenia (including shell shock), epilepsy, and advanced tuberculosis. We are afraid that these phrases express intention rather than achievement. Recent statistics of local authorities show that large numbers of tuberculous men are awaiting admission to sanatoriums. With regard to paraplegia, we are under the impression that the Ministry has hitherto relied upon the Star and Garter Home, established at Richmond by private enterprise, and on provision on a similar basis in Scotland. The care of limbless men is stated in the report to offer the best illustration of the efforts made to combine medical treatment with industrial re-education, but here, again, we are under the impression that the system was in full working order in England, Wales, Scotland and Ireland before the Ministry came into existonce. As to the enlargement of the number of institutions available for the treatment of neurasthenia, the only tangible information we have is contained in Mr. Hodge's onslaught on the Home of Recovery at Golders Green. Mr. Hodge committed himself to the opinion that to send men suffering from shell shock to this institution, which is within a raid area, was absurd, and to the further view that a system of hospitals for such cases only was not the best method of treatment. He wished neurasthenic cases mixed with others, "so that the chirpy cheery chaps would shed some of the sunshine of their presence on the neurasthenics." Mr. Hodge went on to say that he proposed to close the institution at Golders Green and to use it for entirely different purposes. The net result of Mr. Hodge's efforts to enlarge the number of institutions available for nervous cases would seem to be to diminish their number by one, yet from the statistics given by Dr. Fearnsides (p. 346) it appears that of 143 cases treated to a conclusion at the Golders Green institution 66 per cent. returned to work and a further 24 per cent. were rendered fit for work. These results do not seem to support Mr. Hodge's view, and it may, indeed, be argued that if men are eventually to reside and work in London, or any other district exposed to air raids, it might not be a bad plan to let them complete their recovery in a home of recovery within such a district. We would, indeed, commend the whole trend of the discussion at the Neurological Section of the Royal Society of Medicine last week (reported at p. 345) to the attention of the Ministry of Pensions. It shows that, as in so many other instances, skilled treatment is the truest kindness. Another matter on which Mr. Hodge commented was that medical boards asked men what their work and wages were. Doctors, he said, had no right to ask such questions. It appears from the form for a medical report on an invalid that the doctor is only required to state the man's former trade or occupation. Mr. Hodge said that he hoped in the near future to have civilian boards for discharged men, and that doctors who asked such questions would have to answer to him. We believe that as things stand, men who on leaving hospital are not returned to their units, or to convalescent camps, or command dépôts, with a view of their returning to the fighting ranks, nor finally discharged from the army, may be sent to discharge dépôts, of which there are, we believe, five in England and Wales, one in Scotland, and one in Ireland. Here they are examined by one of two boards—a military board, which may discharge them from the army, when they pass directly into the sphere of the Ministry of Pensions; or they may be examined by a civilian board appointed by the Ministry of National Service, which may place them in one or the other of the low categories surplus to the establishment of the army. Such men will be available for civil work, but the army will retain a call upon their services. As we go to press we receive a letter from Sir Matthew Nathan, secretary to the Ministry of Pensions, warning medical practitioners that if they attend pensioners, or the wives of serving soldiers, or widows whose husbands have been killed in the war, they do so at their own risk, and that the Ministry will not be liable for any charges which may be incurred. Such persons must in the first place ask the assistance of the local War Pensions Committee. The Ministry appears to have forgotten that the onset of an illness is sometimes acute. The Ministry of Pensions no doubt has a very difficult task, but we are not sure that it is tackling it in the right way from the medical point of view.

A PARSON-DOCTOR OF THE SEVENTEENTH CENTURY.

IN his presidential address to the Medical Society of London[1] Mr. D'Arcy Power gave an account of John Ward, vicar of Shakespeare's native town in the seventeenth century. He graduated M.A. at Oxford in 1652. Although while at the university he was chiefly interested in chemistry, botany, and medicine, he never took the degree of Bachelor of Physic. It is probable that he was a student of medicine—a recognized status abolished at Oxford within Mr. Power's own recollection—and he seems to have treated sick persons. He left Oxford in 1660, and attended lectures on anatomy at Barbers' Hall, London. He thought of getting a bishop's licence to practise or the M.D. from a foreign university, but took orders instead, and in 1662 became vicar of Stratford-on-Avon, a living he held till his death in 1681. He left a diary, now in the possession of the Medical Society, which consists of a series of sixteen notebooks, extending from 1648, about a year after he entered the university, to 1679. At Oxford he lived in intimacy with members of the "Invisible College," out of which grew the Royal Society. As to the origin of that body he says: "I have heard this guesst abt as ye ground of founding ye Royal Societie. The King well knew yt Harrington who wrote Oceana and such strange fellows as have had their discourses and meetings and have talked of a Commonwealth; whereuppon he instituted another societie whereof his Royal Self vouchsafed to be one, in opposition to itt, not thinking fitt to put down ye other by open contradiction." The first volume of the diary contains notes of a Latin lecture on pleurisy, the urine, and menstruation. There are also extracts on the chemistry of antimony from the *Opera medico-chymica* of Angelo Sala the first of the chemists who ceased to talk nonsense. Ward learnt botany from Bobart, the keeper of the Oxford Physic Garden; the structure of the body he studied in "Briggs, his *Anatomia*"; physic in Ramondaeus, translated by Tomlinson; and surgery in Paraeus (Ambroise Paré), rendered into English by Johnson. Incidentally he mentions a case of hysterectomy: "Dr. Witherburne in London took out ye womb of a woman." From a note written in 1652 we learn that Glisson said that "Jolivius, one of his friends," stated that there was a kind of vessel distinct from the arteries, veins, and nerves, so connected throughout the whole body that their function was constantly to distribute a watery humour through the whole body. This statement was confirmed by Glisson in 1654. Jolivius, or George Joyliffe, after serving as a lieutenant in the Royalist army, studied physic and was incorporated doctor of physic at Cambridge in 1652. He never himself published his discovery, but the lymphatics were described by two other observers—Rudbeck, a Swede, in 1651, and Bartholinus in 1652. Ward assisted "Dick Lower" in some of his experimental work and was much under the influence of that famous anatomist. The notes relating to the practice of contemporary physicians show that medicine was not studied in the same scientific way

[1] Reprinted from the *Transactions*, vol. xl.

as anatomy and physiology. He relates how Thomas Willis, one of the leading investigators and physicians of that day, "imparts his receipts chiefly to two Apothecaries in Oxford." Of George Ent, to whom we owe the publication of Harvey's treatise, *De Generatione*, it is said that he was called to Warwick Castle, "my Lord Brook having a man very sick of ye griping of ye gutts, My Lord asked ye Dr. what was good for itt. He answered white wine plentifully drank if itt was not too sharp would doe itt, hee would lay his life of itt." The result is not recorded. There are many references to George Bate, who at Oxford practised chiefly "among precise and puritanical people, hee was then taken to be one of their number." He moved to London and attended Cromwell in his last illness. At the Restoration he became physician to Charles II. Ward says he had heard that "Bate writt few bills wherein hee did not prescribe scurvy grass, hence some have styled him in my hearing, as relating itt for others, ye Scurvigras Dr., imagining, I suppose, there might be a tang of itt in most diseases." Mr. Power's address deals only with the first six volumes of Ward's MSS., but he hopes at some future time to give an account of the remainder. He says that the notes show Ward to have been well read, clear in his opinions, with knowledge based on experiment, yet with a simple credulity inevitable in an age when scientific knowledge was so scanty and uncertain.

RETINAL DETACHMENTS IN RENAL RETINITIS.

FOSTER MOORE has shown that retinal detachment, though not common in renal retinitis, is yet not so uncommon as has been supposed. He has added [1] thirteen cases to those already published. The detachments are either flat or semi-globular, the former usually occurring in the central region, the latter in the periphery. He considers that they are dependent solely on the retinitis, which is generally of a severe type, and that they are independent of oedema of the rest of the body. The intraocular pressure remains within normal limits. Retinal detachment is especially frequent in the retinitis of pregnancy, and is usually bilateral. Nephritis does not cause detachment in the absence of retinitis. The liability to detachment is largely proportional to the severity of the retinal changes. The immediate cause of a detachment is an active subretinal exudation. If the patient recovers, reattachment of the retina occurs, but after recovery permanent visual defects remain, not due so much to the detachment as to the changes resulting in the central parts of the retina from the extensive and severe retinitis. The prognosis as to life is not modified by the existence of a retinal detachment. The paper is illustrated by some very beautiful photomicrographs of a preparation obtained *post mortem*.

TRENCH FEVER AND THE LOUSE.

THE case against the louse is growing. The theory that it transmits the virus of typhus fever is now generally accepted; it has even been suggested that the virus, whatever its nature, passes through a stage in the louse, but this suggestion is not borne out by the fact that the fever may be directly communicated from one man to another by inoculation. The report of Sir David Bruce's committee on trench fever, which is published elsewhere, gives very strong grounds for believing that the infection of that disease is derived from the contents of the alimentary canal of the louse, since its excreta dusted on, or the crushed bodies rubbed into, a scarified surface induced an attack in six to eight days, while bites of lice from the same batches did not cause infection. The observations rather suggest that the infective agent may be an animal parasite, and as a mere guess the possibility that it is a haemogregarine may be thrown out. An organism of this genus, by which the Indian field rat is infested, passes one stage of its existence in a louse—*Haematopinus stephensi*.

[1] The Royal London Ophthalmic Hospital Reports, vol. xx, part ii.

A MINISTRY OF HEALTH BILL.

IT is understood, writes our lobby correspondent, that the draft of a bill for establishing a Ministry of Health is ready for consideration by the War Cabinet, if, indeed, it has not already been submitted to them. The framing of the measure follows upon the conferences which Dr. Addison, Minister of Reconstruction, has had with various departments and parties affected. Nearly a fortnight ago he announced that agreement had been reached, and encouraged the hope that legislation would be obtained this session. Mr. Bonar Law, replying to a question in the House last week, stated that those concerned with the matter were sanguine that a scheme could be carried through, but he was careful to say that they were sanguine and not to suggest that he was. There is ground for the inference that he is not. Apart from the merits of the bill, whatever they may be, the question of time must weigh seriously in the mind of Mr. Law, as leader of the House. The Government resolved a long while ago that, subject to contingencies, the session should be made as short as possible, more especially because the new Register of Electorate will be available in the late autumn, and it is only right, whether or not there be a dissolution then, that parliamentary work should be rounded off so as to allow of a free decision as to a General Election according to the circumstances of the war. If a bill is to be passed this session, therefore, it must go through practically as an agreed measure, for even so, the detailed examination of the clauses in Committee and on Report would take some little time. The fact that so many persons have been consulted in regard to the drafting of the scheme has led to gossip in the lobby in reference to its provisions. It appears significant that amongst those who are in closest touch with the Insurance Commission the proposals find the least sympathy. The deduction is that between the rival claims of the Local Government Board and the Insurance Commission for place in the fresh constitution, the first named (in so far as it is at present concerned with health) has received greater recognition. Generally, however, the measure is spoken of as a compromise, not going very far at first, and the suggestion is made that it may excite criticism on that account quite as much as if it were comprehensive and definitive. The *Times* of March 21st stated that at a private meeting with Welsh members Dr. Addison said that the bill would probably be introduced immediately after the Easter recess.

THE QUEEN has appointed Sir John Phillips, M.D., to be honorary physician to Her Majesty.

THE Editor of the *Lancet* and the Editor of the BRITISH MEDICAL JOURNAL have been elected, at the annual meeting of the Royal Medical Benevolent Fund, Vice-Presidents of the Fund, in recognition of assistance given to the work of the affiliated War Emergency Fund.

Medical Notes in Parliament.

The Education Bill.

THE Education Bill obtained its second reading on March 18th. The debate began on March 13th, and in its course Mr. Peto presented the objection raised by the British Medical Association to Clauses 18 and 19 as introducing fresh complications in an already very complicated state of affairs with regard to the inspection and attendance on children under existing Acts. No fewer than nine different professional men might be attending a single family under different Acts of Parliament. Most boys between 16 and 18 years of age would be insured persons, and the bill would not only introduce a fresh complication and an overlapping with the health provisions of the Insurance Act, but would be a positive barrier to dealing with the whole of the question of the health of the people on broad and

comprehensive lines. Sir Henry Hibbert said that the medical grant regulations of the Board specified that if the school medical service was adequate and efficient the grant was to be at the rate of one-half of the expenditure. Lancashire had never received more than 40 per cent., because the Department alleged that no comprehensive treatment scheme was in operation, but it was infinitely more difficult in a county area than in a county borough to have a comprehensive medical scheme. In the year ended March 31st, 1915, the expenditure of Lancashire on medical inspection was over £11,000, and the grant £4,166, or 37.85 per cent. The Board refused to take into account any payment to an absent officer in excess of an amount equivalent to his ordinary naval or military pay. The Lancashire Committee in the early stages of the war offered to their officials—of whom they employed nearly 300—that if they would join the forces they would be given their full salary minus one shilling a day because most of them joined as privates. When the full salary was charged to the grant it was immediately objected to. In the resumed debate, on March 18th, Sir Philip Magnus also referred to Clause 15, urging that it was questionable whether the arrangements suggested in the bill were best calculated to secure good physical development or careful and sympathetic treatment during illness. Possibly such arrangements as were now suggested in this bill should be regarded as provisional only, until a Ministry of Health was appointed. Sir William Collins, referring to the physical welfare portion of the bill, gave his support to most of the changes it contained. He considered that the institution of camps, gymnasia, and swimming baths was all to the good, but medical inspection and treatment were to be spread over a much larger area as they were to be applied to secondary schools, and very large considerations would come under review. Some consideration would have to be paid to the representations of the British Medical Association. All questions of medical inspection and treatment would have to be reconsidered in the light of any proposal for a Ministry of Health.

Royal Air Medical Service.—In reply to Major David Davies, who asked what steps were being taken to expedite the transference of R.A.M.C. officers previously attached to the Royal Flying Corps to the Air Force, Major Baird said that the Medical Administrative Committee had met and had come to a number of decisions which were now being dealt with by the Air Council. The officers referred to would, in the first instance, be lent to the air force and would be under the direct control of the Medical Administrator. When the conditions of service for medical officers who were to be seconded to the air force had been decided, those officers who were considered suitable would be seconded to the air force.

Artificial Limbs for Officers.—Colonel Ashley asked why officers were not supplied with a new artificial leg when one was needed, as was done in the case of non-commissioned officers and men. Mr. Hodge said, in reply, that an officer of the army who had lost a leg was fitted with an artificial one free of cost, and was given a wound pension of £100 a year, out of which he was expected to defray the expense of repair and renewal. The wound pension was in addition to retired pay, so that actually no officer who had lost a leg in action got less, in the aggregate, than £150 a year. The question whether it was possible to give military officers further assistance in the matter of artificial limbs was engaging his attention.

Pensioned Soldiers Readmitted to Hospital.—Mr. Macpherson, in a written answer to Mr. Alden, has stated that cases of facial injury in soldiers who received pensions were at present being readmitted to military hospitals. Certain other cases of a special nature were readmitted when the nature of the injury rendered their treatment in a military hospital absolutely necessary in view of the urgency of the particular case.

Maternity and Child Welfare Bill.—This bill, defined as a measure to "make further provision for the health of mothers and young children," was introduced by the President of the Local Government Board on March 14th. It is a bill for England and Wales, and applies to the council of any county or county borough, the common council of the City of London, the council of any metropolitan borough, and the council of any borough or urban district having a population of over 20,000. Power is taken to add to the list the council of any county district. Any of these local authorities may make arrangements, subject to the sanction of the Local Government Board, for attending to the health of expectant mothers and nursing mothers, and of children under five years of age, not attending schools recognized by the Board of Education. There is a proviso that nothing in the Act shall authorize the establishment by any local authority of a general domiciliary service by medical practitioners. A second clause provides that every council in England and Wales exercising powers under this Act or under Section 2 of the Notification of Births (Extension) Act, 1915, shall establish a maternity and child welfare committee, and that all powers of the council under either Act shall stand referred to this committee, which is to consist, as to two-thirds, of members of the council, and as to the remainder, of persons qualified by training or experience in subjects relating to health and maternity; women and members of the Insurance Committees concerned must be included.

Maternity and Child Welfare in Ireland.—Mr. Duke, in reply to Mr. Scanlan, said that arrangements for maternity and child welfare, in pursuance of the Notification of Births (Extension) Act, 1915, had been undertaken by the local authorities of twenty-six urban districts (including the county boroughs of Dublin, Belfast, Londonderry, and Waterford) and of two rural districts, and comprised schemes of health visiting of mothers and young children by duly qualified nurses, provision of medical and midwifery attendance in necessitous cases of confinement not otherwise provided for, the institution of maternity centres and day nurseries, and the supply of milk and dinners for necessitous mothers and young children. An Exchequer grant was available to defray half the cost, and in the current financial year was being distributed by the Local Government Board to twenty-four local authorities and to twenty-eight voluntary agencies administering approved schemes. Further schemes on similar lines were being formulated.

Maisons Tolérées in France.—In reply to Mr. Lees Smith, Mr. Macpherson said, on March 19th, that it had been decided, with the permission of our allies, to put *maisons tolérées* in France out of bounds for our soldiers. He added that it was not the British authorities, as had been asserted, who established these houses or who provided the women in them, nor could he find any justification for the assertion that any part of the French civil population protested against any of these institutions established under their own laws; nor did our military authorities in France receive any such protest. Though this step had been taken the House must not think that the very grave problems of venereal disease which confronted the military authorities in France had been disposed of. Military advisers had grave doubts that the contrary might not be the effect. The question, which it must be remembered was not merely a military one, but a great social and national question, would continue to be watched with anxiety by the War Office. Brigadier-General McCalmont asked whether the decision had been come to without the concurrence of the military authorities. Mr. Macpherson replied that it had been come to with the concurrence of our allies. Mr. Gulland asked what was the punishment for being out of bounds. Mr. Macpherson said that one great effect of the new order was to add to the many punishments which were inflicted under the Army Act.

THE WAR.

TRANSMISSION OF TRENCH FEVER BY THE LOUSE.

A COMMITTEE for the study of trench fever, with Major-General Sir David Bruce, K.C.B., M.D., F.R.S., as chairman, was appointed last December by the Director-General, Sir Alfred Keogh, G.C.B., acting on a suggestion received from France regarding the co-ordination of research on this most important subject.

The committee at once set itself to try to solve the problem of the causation and spread of the disease, and has now presented the following interim report.

Method.

In view of the already widespread belief that the body louse was the guilty agent steps were at once taken to feed lice bred from "clean stock" on trench fever patients, of whom there were at the time many in the new end section of the Hampstead Military Hospital under the charge of Major W. Byam, R.A.M.C., a member of the committee, who has supervised the clinical and experimental work. The committee was fortunate in having Mr. Bacot of the Lister Institute to control the supply and feeding of the lice.

Experiments with Living Infected Lice: Negative.

Two volunteers, Messrs. Cole and Edgeler, came forward on January 3rd, 1918, for the purpose of the experiment from patriotic motives, as they were well over military age and not able to serve their country in more strenuous ways. Lice were taken from clean stock bred in this country. These lice were fed at intervals on many febrile and afebrile trench fever patients, at all stages of the disease, who had been sent over from France and had relapsed in this country. The lice were then placed on the volunteers, directly on the skin without any intervening gauze, the shortest interval between feeding on a case of trench fever and on the volunteer being six hours. After feeding they were returned to the box and kept in the incubator at 25° C. until again required. This experiment was commenced on January 5th, and was continued

daily for one month, at least 500 lice being used every day. The feeding experiment in one of the men was then discontinued, and although he has now been under observation for over two months he has shown no signs of fever.

The experiment was continued on the other man, but the conditions were altered: lice were fed on febrile cases of trench fever, and then after intervals of, at one time, fifteen minutes, at another of one hour and two hours, on the volunteer daily up to February 13th, but again without any positive results as regards development of trench fever.

Experiments with Excreta and Crushed Bodies of Infected Lice on Raw Surfaces: Positive.

At the committee meeting on January 23th, Major Byam, in reply to a question, stated that these men did not scratch themselves, and, indeed, purposely refrained from scratching, this excluding to a large extent infection by means of excreta or crushed bodies of the lice; he therefore proposed that two more volunteers should be obtained and "scarification" experiments carried out.

On February 5th two men, Seymour and Sullivan, who also volunteered, were used for this purpose. In the case of Sullivan a small area of skin, one inch square, was slightly scarified, and a small quantity of the dried excreta taken from the boxes of lice which had fed on trench fever cases was dusted on this area and rubbed in. On Seymour's arm eleven lice taken from a trench fever case were crushed on the scarified area. On February 14th Sullivan was suddenly attacked with typical trench fever after an incubation period of eight days. On February 16th Seymour also went down with fever (incubation period ten days).

This dramatic result was at once (February 19th) reported to the Director-General, Army Medical Service, and also to the Medical Investigation Committee in France, with whom the committee had been in close collaboration throughout, all minutes and results of experiments having been forwarded; in addition, Lieutenant Peacock, R.A.M.C., who had assisted Mr. Bacot in the earlier work here, was lent to the Medical Investigation Committee on January 24th to assist in the same work in France. The fever which these men Sullivan and Seymour developed was indistinguishable from that produced in other volunteers by an injection of whole blood from trench fever cases who had contracted their disease in France. In view of the importance of this discovery the committee decided to repeat the same experiment.

Three other volunteers at once came forward—Messrs. Reynolds, Tullett, and Glover. These men were each inoculated on February 19th on a scarified spot on the forearm with a small quantity of dried excreta from boxes of lice fed on trench fever cases.

On February 26th Reynolds went down with trench fever. On February 27th Tullett was taken ill, and on February 28th Glover; the incubation periods being six, seven, and eight days respectively.

The chain of evidence was completed by the fact that a small quantity of blood taken from Reynolds on the second day of his fever, and inoculated into another volunteer (Ward), produced a typical attack of trench fever after an incubation period of five days.

The fever in every instance, although mild, was yet typical of the so-called trench fever—sudden onset, temperature of 103° F., pain in the head and limbs, and over the spleen, the initial attack of fever lasting two or three days, and followed in practically every case by a relapse or relapses at an interval of usually seven days; the fever in the relapse being lower and more transient, with a recurrence of the symptoms associated with the initial attack.

Conclusions from Experiments.

It will thus be seen, from the above experiments, that it has been shown that the bite alone of the infected louse does not produce trench fever, but that when the excreta taken from such lice are scratched into the skin fever followed in every instance, the average incubation period being eight days.

This observation is of great importance in view of the prevention of the disease, and would explain cases of trench fever arising in wounded men who may have had no lice on them for some weeks, as the dried excreta, if blown on to a raw surface, would readily give rise to the disease.

Some further experiments carried out at Hampstead on the migration of lice are also of great interest, as it has been shown that if two men be available, one with a normal temperature and the other with fever, the lice will leave the fever case and pass quickly to the man with the normal temperature. Experiments are now in progress with the excreta of normal lice, as it is possible that the disease is not necessarily carried from man to man by lice but simply from louse to man.

Action Proposed.

In view of these results and their corroboration by the Medical Investigation Committee in France, it is hoped that a very determined campaign will be instituted against the louse, and thus eliminate, or at least reduce, the incidence of a fever which has up to now caused so great a drain on our man power at the front.

The fact that these experiments have been carried out in London is of the first importance, as there can be no suspicion of an accidental or natural infection, for the men employed had not been out of England for many years and had been under observation for some months previous to the experiments; also they were housed entirely apart from the hospital in which the cases of trench fever were being cared for.

The funds for this research have been provided by the Lister Institute of Preventive Medicine.

CASUALTIES IN THE MEDICAL SERVICES.

ROYAL NAVY.

Died on Service.

SURGEON T. S. BRADBURN, R.N.

Surgeon Thomas Stratford Bradburn, R.N., died at Wasperton, Warwick, on March 8th, aged 37. He was the only son of the late Thomas Bradburn of Slade Hill, Wolverhampton, and was educated at the universities of Oxford, where he graduated M.A. in 1903, of Edinburgh and Birmingham. He took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1909, and D.P.H.Bristol in 1913. After acting as house-surgeon and house-physician of Queen's Hospital, Birmingham, and as house-physician of the Brompton Consumption Hospital, he took a temporary commission as surgeon in the Royal Navy in 1914.

ARMY.

Died on Service.

LIEUT.-COLONEL M. E. REPORTER.

Lieut.-Colonel Maneckjee Eduljee Reporter, Madras Medical Service (retired), died of heart failure at Kistna, Madras Presidency, where he was district medical and sanitary officer, on January 18th, aged 67. He was educated at the Grant Medical College, Bombay, where he took the diploma of L.M.S. in 1876, subsequently taking the L.R.C.S.Ed. and L.R.C.P.Lond. in 1877. Entering the I.M.S. as surgeon on October 1st, 1877, he became surgeon-major on October 1st, 1889, and surgeon-lieutenant colonel on October 1st, 1897, retiring on November 27th, 1902, and rejoined for duty during the war. He served in the third Burma war in 1887–88, taking part in the operations of the 5th and 6th Brigades, and received the medal with two clasps.

Wounded.

Captain J. F. Carroll, R.A.M.C. (temporary).
Captain D. A. Wilson, R.A.M.C. (temporary).

DEATHS OF SONS OF MEDICAL MEN.

Corbett, Reginald David de la Cour, Major Indian Infantry, attached Royal Flying Corps, eldest son of the late Colonel R. de la Cour Corbett, R.A.M.C., died as a prisoner of war at Changri, in Asia Minor, on December 25th, 1917, aged 35. He was born on August 22nd, 1831, educated at Bedford, and at Sandhurst, where he was in the Rugby fifteen, and got his first commission in the Royal Irish Rifles on May 8th, 1901. He served with them in the South African war in 1901–2, and received the Queen's medal with four clasps. On May 2nd, 1904, he joined the Indian Army, being posted to the 48th Pioneers. He became captain on May 8th, 1910, and had reached the rank of major during the war. In 1908 he was on famine duty, and in 1912 was appointed tutor to the Raja of Awa. In 1914 he rejoined his regiment, and went with it to Mesopotamia, and in May, 1916, he was mentioned in dispatches. He was one of the garrison of Kut.

Gough, John Noel, Second Lieutenant Royal Field Artillery, third son of Dr. H. E. Gough, of Northwich, killed in action on

March 8th, aged 20. He was educated at Elstree, at King's School, Canterbury, and at Trinity College, Cambridge, where he held a scholarship. He had served in France for a year. His eldest brother was killed in Palestine last December, the second is serving in Mesopotamia.

Inglis-Clark, Charles, Captain Army Service Corps, son of Dr. Inglis-Clark, of Edinburgh, died of wounds on March 6th. He got his first commission on January 20th, 1915.

Lynden-Bell, Colin Sutherland, Lieutenant 99th Dekkan Infantry, son of Colonel E. H. Lynden-Bell, A.M.S., accidentally killed recently in Mesopotamia. He was educated at Harrow and Sandhurst, joined the Royal Fusiliers, served with them in France in 1914, and was invalided home for wounds. On recovery he joined the Indian army, and had served on the North-West frontier before going to Mesopotamia. His commission was dated August 15th, 1914.

[We shall be indebted to relatives of those who are killed in action or die in the war for information which will enable us to make these notes as complete and accurate as possible.]

HONOURS.

Major-General (temporary Lieut.-General) T. H. J. C. Goodwin, C.M.G., D.S.O., Director-General Army Medical Service, has been appointed a Companion (Military) of the Most Honourable Order of the Bath for valuable services rendered in connexion with the war.

MENTIONED IN DISPATCHES.

Lieut.-General Sir Stanley Maude, K.C.B., Commanding-in-Chief, Mesopotamia Expeditionary Force, in a dispatch dated November 2nd, 1917, mentioned the following medical officers for distinguished and gallant services and devotion to duty:

Staff and Head Quarters.—Colonel (temporary Surgeon-General) A. P. Blenkinsop, C.B., A.M.S.; Major (temporary Lieut.-Colonel) W. H. Hamilton, D.S.O., and Lieutenant J. B. de W. Molony, I.M.S.

Royal Army Medical Corps.—Brevet Colonels M. H. G. Fell, C.M.G., J. M. Sloan, C.M.G., D.S.O.; Lieut.-Colonel (temporary Colonel) S. F. St. D. Green; Lieut.-Colonels J. H. R. Bond, D.S.O., W. A. Woodside, D.S.O.; Brevet Lieut.-Colonel D. S. Skelton, D.S.O.; Majors (acting Lieut.-Colonels) G. E. Cathcart, J. F. Whelan; temporary Major (temporary Lieut.-Colonel) R. Davies-Colley; Captain and Brevet Major W. McNaughton; Captains W. H. Biggs (T.F.), T. K. Boney (S.R.), A. E. Bonham (T.F.), J. W. Dalglish (S.R.), W. Dunlop (S.R.), M. Foster (S.R.), D. R. Hennessy (S.R.), T. P. Inglis (S.R.), C. M. Ingoldby, J. de M. Kneebone (S.R.), J. W. MacLean, J. P. Mitchell (S.R.), W. K. Morrison, D.S.O., G. N. Smyth (S.R.); temporary Captains R. C. Begg, T. P. Buist, T. S. Keith, G. S. Marshall, V. E. Negus, C. J. B. Pasley, A. Poole, K. N. Purkis, R. Y. Stones, G. S. Terry; Lieutenant (temporary Captain) H. P. Rudolf; Lieutenant J. Ewing; temporary Lieutenants D. F. Borrie, G. Dougan, A. C. Lambert; temporary Quartermasters and honorary Lieutenants C. Hunt, C. E. Malyon.

Indian Medical Service.—Lieut.-Colonels F. W. Gee, F. O. N. Mell, C.I.E., T. B. Kelly; Brevet Lieut.-Colonel C. M. Goodbody, D.S.O.; Majors (acting Lieut.-Colonels) E. W. Browne, C. A. Gourlay, J. C. H. Leicester, W. Lethbridge; Majors (temporary Lieut.-Colonels) R. M. Barron, F. P. Connor; Majors R. J. Bradley, R. Kelsall, D.S.O., W. H. Leonard, T. G. F. Paterson, D.S.O., E. A. Roberts; Captains C. H. P. Allen, M. Das, P. K. Gilroy, G. G. James, D. D. Kamat, R. F. D. MacGregor, M.C., A. A. C. McNeill, W. A. Mearns, J. A. S. Phillips, A. L. Sheppard, J. MacG. Skinner, W. D. H. Stevenson, W. E. R. Williams; Lieutenant W. P. Hogg.

ORDER OF THE BRITISH EMPIRE.

The following medical names appear in the list of further appointments to the Most Excellent Order of the British Empire for services in or for the Overseas Dominions, Colonies and Protectorates and in connexion with the war in France, Egypt and Salonica.

To be K.B.E.—Dr. James William Barrett, C.M.G., for services in connexion with the Australian Branch of the British Red Cross Society in Egypt, etc.

To be O.B.E.—Dr. Edith Helen Barrett, honorary secretary Australian Branch of the British Red Cross Society; Dr. A. Ruskin Cook, medical officer, Church Missionary Society Hospital, Kampala, Uganda; Lieut.-Colonel C. E. P. Fowler, R.A.M.C.; Dr. R. E. Weigall, organizer of motor service for the reception of returned and wounded soldiers.

A special Supplement to the *London Gazette*, issued on March 19th, contains the statements of the acts of "conspicuous gallantry and devotion to duty" for which the decorations announced in the *London Gazette* of October 27th, 1917, and noted in the BRITISH MEDICAL JOURNAL of November 3rd, 1917, p. 600, were conferred. The following officers of the R.A.M.C. are included in the list:

Distinguished Service Order.

Temporary Captain John Caruthers Sale, M.C.

He collected the wounded over a large tract of country exposed to heavy fire, and continuously went out by night in advance of the front line searching for the wounded, many of whom he brought back over most difficult ground and under heavy fire. His coolness and determination were a splendid example to his stretcher-bearers.

Bar to the Military Cross.

Temporary Captain Hugh Ross MacIntyre, M.C.

When in charge of the evacuation of the wounded he from time to time led his stretcher-bearers and cleared the wounded, although exposed to fire from snipers. He worked untiringly and incessantly for three days without sleep, and it was due very greatly to his efforts that the regimental aid posts were kept clear of wounded, and cases quickly evacuated to the advanced dressing station. He is fearless in the face of danger, and by his splendid courage and example he inspired confidence in his men.

Military Cross.

Temporary Captain Leslie Haden Guest.

On the night of an attack he gallantly led his stretcher squads under heavy shell fire and collected wounded who were lying out on newly captured ground. By his courageous example and disregard of danger he was the means of saving many wounded men.

Temporary Captain William Llewellyn Aplin Harrison.

He established his aid post within 200 yards of the front line as soon as the objective had been reached, and thereby saved many lives. Though his aid post was twice destroyed by shell fire, he continued at work with complete disregard of danger, inspiring all who came in contact with him by his splendid example.

Temporary Captain William George Johnston.

Whilst in command of the stretcher-bearers evacuating the wounded, he worked under shell fire for fifty-five hours, leading his bearers time after time to collect wounded lying out in the open. On another occasion he went out under heavy shell fire and succeeded in getting out alive some men who had been buried in the forward trenches. His fearless conduct, disregard of personal danger, and devotion to duty saved many valuable lives.

Temporary Captain Robert Kennon.

During the recent operations this officer continued for three days to dress wounded, during which period he was continually under heavy shell fire, and his dressing station was blown in. With the greatest coolness and devotion to duty he continued his life-saving work, and was a splendid example to all ranks.

Temporary Captain John Kirton.

He went forward under shell fire to dress and collect wounded and help and encourage the stretcher-bearers at their duties, working for five consecutive days without rest. It was largely owing to his excellent work that the evacuation of the wounded of the division was successfully carried out, and by his efforts many wounded men were got into safety.

Temporary Captain Wilfred John Pearson.

When in charge of the evacuation of the wounded he worked under heavy shell fire for fifty hours without rest, and it was largely due to his untiring efforts that the wounded in this sector were got away so quickly. On one occasion, though caught in the barrage of the enemy's heavy guns, and though severely shaken, he continued to work without intermission, his untiring labours being instrumental in saving many valuable lives.

Temporary Lieutenant Henry Marston Layard Crawford.

He dressed and collected the wounded under heavy shell fire, and on the withdrawal he remained with the rearguard, still under heavy fire, collecting more wounded. By his pluck and determination he succeeded in bringing in all his wounded, though compelled to make a wide detour through exceptionally heavy and difficult country.

Temporary Quartermaster and honorary Lieutenant Charles Elliot.

Whilst in charge of the arrangements for the evacuation of the wounded, he time after time took men out under heavy shell fire and repaired the line. He frequently volunteered to go forward and find out the position of wounded men lying out in the open. He worked incessantly for fifty hours without rest under fire, and showed a splendid example to others.

The Military Cross has also been conferred upon Captain John Joseph Harper Nelson, I.M.S., for conspicuous gallantry in action.

He tended the wounded in the open for a long period, although exposed to heavy fire of all descriptions. He showed fearlessness throughout, and his example was of great value to all.

Scotland.

THE SYMPATHETIC AND PARASYMPATHETIC SYSTEMS.

DR. J. J. GRAHAM BROWN, Physician to the Royal Infirmary, Edinburgh, delivered the course of Morison Lectures for this year before the Royal College of Physicians of Edinburgh on March 4th, 6th, and 8th. The lectures were concerned with a review of certain disorders of the sympathetic and parasympathetic systems.

Introduction.

The lectures treated first of the general arrangement, functions, antagonism, and synergic action of the autonomic nervous system. That system consisted of two sets of neurones, the sympathetic and the parasympathetic, governing the organic functions outside the control of the will, smooth muscle, heart innervation, the secretion of glands, and the endocrine organs. The sympathetic and parasympathetic differed in origin and in function. They were antagonistic, yet in such a way as to harmonize for the good of the individual, synergic action taking place in connexion with the sexual activities. Their antagonism was well illustrated in their action on the

pupil, on peristalsis, and metabolism, their reaction to drugs, hormones, and toxins. Normally equipoise was maintained. But one or the other might be temporarily dominant, and that to a considerable extent, within the limits of health. But there were individuals whose sympathetic neurones were in too high a tonus, others in whom the parasympathetic was hypersensitive. Such persons might show no symptoms, but would be readily affected by toxins which had an affinity for the over-sensitized system. They often presented a clinical syndrome by which it was possible to recognize the dominant system, corresponding, as it were, to the old "temperaments," "constitutions," and "diatheses."

The Sympathetic System.

The sympathetic fibres originated in small cells in the intermedio-lateral tract of the cord and the pre-ganglionic fibres left the cord as the white rami communicantes from the level of the first thoracic to about the second lumbar segment. They had one synapse in a ganglion on their course, then the post-ganglionic non-medullated fibre passed to the effector organ; the synapse occurred either in the segmentally related ganglion of the lateral sympathetic chain, a ganglion at a higher or lower level, or in one of the prevertebral ganglia of the abdomen. An exception was afforded by those fibres which pass direct without a synapse to the suprarenal medulla, which developmentally is part of the sympathetic system; it only secreted adrenalin if stimulated by the sympathetic, and the latter only acted if its myoneural junction was sensitized by adrenalin. The functions of the sympathetic were widespread, and the corresponding clinical symptoms of overstimulation varied. It accelerated the heart and constricted the blood vessels, the splanchnics being most affected. In the alimentary canal it inhibited peristalsis and caused contraction of the sphincters; it inhibited the bronchial muscles, caused anabolic secretion of many glands, stimulated the liver cells, inhibited the external secretion of the pancreas, and thus caused polycythaemia, lowered the threshold for sugar, and regulated carbohydrate metabolism. It also stimulated the thyroid and possibly the posterior lobe of the pituitary, and increased the metabolism of fats and proteins. There was a tendency to an increase of the mononuclear lymphocytes of the blood. Other clinical results were dilatation of the pupil, protrusion of the eyeball, widening of the palpebral fissure, goose-skin, perspiration, pyrexia, accelerated breathing, and greatly increased blood pressure. Varying combinations of these were illustrated by cases, one showing marked unilateral symptoms.

The adequate stimulus for the sympathetic was strong emotion such as pain or fear; it acted as a rapid protective mechanism to brace the organism against danger. The sympathetic was also an instrument by which the Ego manifested itself — for example, the eyes altered and lighted up on the recognition of a friend; in this connexion it was remembered that though the fibres appeared to arise in cells of the cord impulses passed down to these from higher centres, possibly from the optic thalamus, which probably influenced also the affective tone of the facial muscles. In some individuals the effects of a strong stimulus might remain, adrenalin and thyroid over-secretion continue, and a condition of what had been called "crystallized fear" result, as in Graves's disease, which was really a disease of the sympathetic system. The thyroid also stimulated the sympathetic apparatus through the suprarenal but was not so essential as adrenalin. Such a condition was more common in the female sex, and the clinical picture was a person of mid-height, spare, thin, of fine build, the features delicate and mobile, and complexion fair; the emotions were not under good control, muscular movements were quick and reflexes sharp, tachycardia was readily produced, the blood showed some mononucleosis, and the sugar threshold was lowered. Drugs which stimulated the sympathetics were iodine, beta-tetra-hydro-methylamine, morphine, and the autocoids adrenalin, thyroid, and probably the posterior lobe of the pituitary. Of the toxins which stimulated it, the more important appeared to be the monamines formed by putrefactive anaërobic action in intestinal stasis (what Barger called "sympathio-mimetic" amines). Of these, tyramine was the most important, and probably many cases of sympathetic hypertonus were due to the long-continued production of such bodies; hence the good effects often got from the use of intestinal antiseptics.

Sympathetic hypotonus occurred normally during sleep, from exhaustion due to long-continued over-stimulation, and where toxic destructive processes had affected the suprarenal or thyroid, as in Addison's disease and myxoedema. The suprarenal secretion was also depressed by the toxin of tubercle even when the organ itself was not attacked.

The lecturer then spoke of the afferent neurones of the sympathetic system, especially in connexion with the reflex tonus of abdominal muscles, the phenomena of referred pain, and the axon reflex.

(To be continued.)

England and Wales.

THE MARY BIRRELL DAVIES MEMORIAL FUND.

IT is little over a year since Dr. Mary Birrell Davies passed away, leaving behind the memory of a life well spent in doing good, not only in matters medical, but also in ameliorating the conditions of life and encouraging to self-help and reliance the poorer classes of the city of Liverpool. Many of her friends and patients at once determined to keep her memory green by raising a fund which would be a tangible sign of the esteem and affection in which she was held. The sum received, amounting to £2,400, has been handed over to the University of Liverpool with the object of making one open-entrance scholarship for women medical students. The scholarship is of the value of £60 a year, and is tenable for four years. It will be awarded every alternate year.

FINANCE OF HOUSING SCHEMES.

The Local Government Board (England and Wales) has issued a circular to local authorities stating the conditions under which financial assistance from public funds will be given to those local authorities prepared to carry through without delay at the conclusion of the war a programme of housing for the working classes. The arrangement with the Treasury is that the local authority should meet the full cost out of a loan (for not less than seven years), the state undertaking to make a grant relieving the authority of 75 per cent. of the estimated annual deficit. At the end of the period the property is to be valued and 75 per cent. of the excess, if any, of the amount of loan outstanding over the then value of the property is to be met by the state. In rural districts the proportion of the expense to be met by the state may be higher, if the cost exceeds the produce of a rate of a penny in the £. The Royal Institute of British Architects is conducting a competition for suitable designs for houses, and a committee appointed by the Board is considering questions of building construction. A committee appointed by the Minister of Reconstruction is investigating the question of material.

SMALL-POX IN LONDON.

Twenty-seven cases of small-pox have been notified in London, including three in the extra-county borough of East Ham. Mr. F. R. Anderton, Chairman of the Public Health Committee, informed the London County Council on March 19th that there was reason to hope that the measures adopted had obviated the possibility of a serious outbreak. As a matter of emergency, however, the Council decided to make chicken-pox a notifiable disease until June 30th. The Bethnal Green Borough Council had already made such an order for one month from March 6th. The Local Government Board has issued a notice recommending that persons living in or near localities where cases of the disease have occurred, and who have not been successfully vaccinated since childhood, or whose original marks of vaccination are imperfect, should secure the protection afforded by vaccination. It has been ascertained that a person suffering from small-pox in its earliest stage spent several hours in an air-raid shelter, and all the contacts have not been found.

Ireland.

Salaries of Poor Law Medical Officers.

In connexion with the agitation and the resignations, in certain districts, of Poor Law medical officers for increased salaries, the *Irish Independent* in an editorial says:

In the course of the lengthy correspondence about the grievances of Irish dispensary doctors the fact was demonstrated that there are boards of guardians which cannot, or will not, understand the position of the medical officers in their service. Having settled down into a rut of habit and, perhaps, prejudice, it is hard to get these boards to lift themselves out of it. They seem to think that the doctors are all too importunate in asking for increases of salary, but the same boards may be quite benevolently disposed towards claims of workhouse officials which are urged with much less reason and restraint than those of the medical officers. However, it is evident that the recent correspondence was not without producing a good effect. This is seen in the favourable reception given in various districts to a number of applications for increases which have recently been made by dispensary doctors. If the cases were dealt with solely on the merits there could be no cause of complaint.

Irish Medical Schools Dinner.

The Irish Medical Schools' and Graduates' Association held its St. Patrick's Day dinner at Pagani's Restaurant, Great Portland Street, London. Dr. Kenneth Frazer presided. The toast of "Our defenders" was proposed by Dr. Douglas, who mentioned that the guests included Surgeon-General Sir William Donovan, who had had charge of something like a million soldiers in the war. Deputy Surgeon-General Miller, R.N., responded for the navy, and Major Jocelyn Swan for the army. The latter said that two past presidents of the association—Sir Alfred Keogh and Sir Havelock Charles—had taken leading parts in the organization of the medical services in this war. No fewer than forty-two Irish medical graduates had distinguished themselves by signal heroism at the front during 1917. Dr. A. Giles gave "Our visitors," to which Major Willoughby replied. The other toast, "The Association," was responded to by the president.

Correspondence.

LONGEVITY.

Sir,—Dr. William Bramwell gives a generous approval to my paper, "On the influence of muscular exercises on longevity," but finds that I have not sufficiently insisted on the importance of mental exercise. I therefore hasten to state that I thoroughly agree with him about "the life-prolonging tendencies of mental activity," to which I have devoted a paragraph in the little book on *Prolongation of Life*. My remarks in the Journal of February 23rd I purposely restricted to muscular exercises, and alluded only slightly to the influence of mental work, and of the tenor of mind, of cheerfulness, and contentedness as prolonging, of gloominess and pessimism as shortening, agencies. Nor have I entered into moral matters, such as, on the one side, the suppression of anger, envy, jealousy, avarice, undue ambition, etc., and, on the other, the cultivation of sympathy, benevolence, helpfulness, and a good conscience, which is a great asset towards a happy old age.—I am, etc.,

Bournemouth, March 18th. Herman Weber.

Sir,—There is much more to be said on longevity than is contained in the contributions by Sir Herman Weber and Dr. William Bramwell.

To live long without being well in body, mind and soul is wearisome. The difficulty about the whole matter is that most men and women wake up too late in life to know the full importance of the growth of the whole man. We have waited many centuries to obtain Mr. Fisher's Education Bill, which for the first time takes into consideration, and means to put into practice, the education or drawing out of the three essential parts of our nature—namely, the physical, intellectual, and moral. It is when all these qualities are early trained and progressively taught and practised throughout the entire life, that the pleasures of health, mental equipment, and balanced character will be enjoyed even to old age.

Our profession has been slow to preach and practise these great truths, perhaps because of our want of political and municipal power. I can conceive no greater advantage to our nation at this time than for the whole medical profession, with its unique knowledge, to throw its full weight and power into the present educational campaign.—I am, etc.,

Folkestone, March 18th. W. J. Tyson, M.D., F.R.C.P.

ATTENDANCE ON DISCHARGED DISABLED MEN AND THE WIVES OF SERVING MEN AND WIDOWS.

Sir,—I am desired by the Minister of Pensions to ask your permission to call attention to a matter of some importance affecting the interests both of medical practitioners and of the public. Cases have come before Mr. Hodge in which both discharged disabled men and wives of serving soldiers or widows whose husbands have been killed in the war have obtained medical attention during illness and on being presented with the bill by the practitioner have appealed to the local War Pensions Committee or to the Ministry for assistance towards meeting it. It is clearly contrary to all principles of sound administration that bills thus presented after the event should be recognized as a charge upon public funds. A disabled man is entitled under the Instructions of the Ministry to apply to his local War Pensions Committee for the treatment necessary to his case, and is instructed to do so by notification at the time of his discharge and by public notice in post offices and elsewhere. Similarly widows of men who have been killed and the wives and dependants of serving soldiers are in cases of serious illness entitled to ask the assistance of their local War Pensions Committee. Practitioners should therefore realize, if they take up cases without previous understanding as to the extent of assistance which will be given by the local War Pensions Committee or the Ministry, that they do so at their own risk and that the Minister cannot be held liable for any charges which may be incurred.—I am, etc.,

Matthew Nathan,
Secretary.

Ministry of Pensions, Secretary's Office, Westminster House, Millbank, London, S.W.1. March 19th.

SUPPLY OF ARSENOBENZOL DRUGS TO GENERAL PRACTITIONERS.

Sir,—In reply to Dr. J. A. Butler, I may point out that I did not say that the intramuscular route was clinically preferable to the intravenous; I agree that it is not. I said that the latter constituted the only passport possessed by the doctor usually consulted by the infected "amateur" for the possession of free salvarsan. My point was social, not clinical.

My personal experience with the intramuscular route does not quite agree with that of Dr. Butler, though, like him, I think it unwise to generalize from it. I have given arsenobenzol in some form intramuscularly in about fifty instances, excluding hospital cases, and I have only once seen anything like the disabling pain he describes. I think it is important to use a cream that has not been repeatedly heated, and which contains an adequate proportion of creocamph, but it is also essential to inject deeply in the gluteal muscle, and to avoid proximity to the sciatic nerve.

The bulk of our experience, however, has been obtained in the various hospitals, and I can find there no record of severe pain. I do not agree that in estimating the value of a remedy a large class should be ruled out because they are "under discipline."—I am, etc.,

Sheringham, March 18th. A. Knyvett Gordon.

STAFF PAY FOR REGISTRARS OF MILITARY GENERAL HOSPITALS.

Sir,—I have for many years urged that medical officers filling the important part of "secretary and registrar" of military general hospitals should receive staff pay in addition to their ordinary military pay. For a general hospital of 500 beds I would give the registrar 5s. per diem extra salary, and for a 1,000 bed hospital 10s. per diem. It is a very important duty, and the pay would be a stimulus for medical officers to study specially this line of staff duty. It seems to me strange so vital a matter has been for years neglected.—I am, etc.,

George J. H. Evatt, M.D.,
Surgeon-General (retired).

Junior United Service Club, London, S.W., March 15th

Universities and Colleges.

UNIVERSITY EDUCATION IN WALES.

THE Royal Commission on University Education in Wales has made a unanimous final report. It recommends the continuance of a single national University of Wales, but a remodelling of the existing organization. The university should set the standard of admission for students and the period of residence and study for the initial degrees, but the approval of syllabuses of courses should be a matter entirely between the teacher and his college. The college should be responsible for the intermediate examinations. The Welsh National Medical School should be organized as an independent constituent college of the university, governed by a council and senate of its own.

A committee, of which Sir William Osler is chairman, met in Cardiff last week to prepare a scheme for the Mansel-Talbot Chair of Preventive Medicine endowed by Miss Talbot. When the scheme had been approved the election of a professor will be proceeded with.

UNIVERSITY OF EDINBURGH.

AT a meeting of the General Council on March 13th two proposals affecting medical education were confirmed. The first provides for the introduction into the medical curriculum of instruction in tuberculosis, consisting of lectures and practical work, attendance on which will be obligatory for the degrees of M.B., Ch.B. as from October, 1918. The other proposes that when the chair of materia medica falls vacant a separate chair of therapeutics bearing the name of the late Sir Robert Christison shall be established, and a separate course of therapeutics required. Another draft ordinance approved affected regulations for the admission to Scottish universities; it provides that the educational test for admission should be co-ordinated with the national system of leaving certificates from secondary schools on conditions which will fully safeguard the freedom of the universities. All questions as to entrance will be determined by a Scottish Universities Entrance Board.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary Council was held on March 14th.

The Council adopted the following resolution:

> That in view of the large reduction in the number of candidates presenting themselves for the first and second professional examinations for the licence in dental surgery, the number of examinations will be reduced to two in the year, namely, May and November.

Diplomas were issued to nine candidates found qualified for the licence in dental surgery at the recent examination.

Election of Council.

There are six candidates for election to the Council of the College on Thursday, July 4th, and four vacancies. Sir Watson Cheyne and Mr. Bilton Pollard will not seek re-election. Sir John Bland-Sutton and Mr. Walter Spencer are again candidates. An analysis of the Council as it now stands appeared in the JOURNAL last week, p. 330. The four new candidates are Mr. J. Lynn Thomas, C.B., C.M.G., of Cardiff, Fellow since 1892; Mr. H. B. Grimsdale, ophthalmic surgeon, St. George's Hospital, Fellow 1894; Mr. F. J. Steward, Guy's Hospital, 1898; and Mr. E. W. Hey Groves of Bristol, Fellow 1905 (Member 1395).

Obituary.

DR. SYBIL LONIE LEWIS, who died at Hull on March 10th after a short illness, was born in 1874. She studied medicine in Edinburgh and Dublin, having previously been trained in nursing and midwifery, and obtained the L.R.C.P., L.R.C.S., and L.R.F.P.S. diplomas in 1905. After serving as assistant resident medical officer at the Larbert Asylum she began practice in Hull, and held the appointment of school medical officer and the honorary medical officerships of the Diocesan Maternity Home, the Hull Sheltering Home for Girls, and the West Hull Crèche. In the spring of 1915 Dr. Lewis volunteered for work in Serbia, and went out there in June under the Scottish Women's Hospitals. She was in Serbia when the country was overrun by the enemy and the hospital staffs taken prisoners in 1915. Although a Red Cross party, they were detained in Hungary for four months, under the roughest conditions, and were not released and sent home until February, 1916. Dr. Lewis went out again in August, 1916, and worked with the Serbian army in Macedonia and among the civilian refugees till December, 1917, when she was recalled by urgent need at home. She received the Serbian decoration of the Order of St. Sava, Fourth Class, in recognition of her devoted work among the Serbs. Her illness lasted only three days, but, in the opinion of the surgeon attending her, the conditions causing it were contracted abroad, and her name must be added to the growing list of medical women who have given their lives for Serbia.

Medical News.

THE Gill Memorial of the Royal Geographical Society has been awarded to Dr. Cuthbert Christy for his surveys and explorations in Central Africa.

THE Royal Dental Hospital, Leicester Square, has received Canada 3½ per cent. Registered Stock to the value of £500 from the executors of the late Mrs. Gore-Lloyd.

A MILK dealer of Islington was sentenced at the North London Police Court on March 15th to a month's imprisonment with hard labour, and ordered to pay £5 costs, for selling milk adulterated with added water to the extent of 36 per cent.

THE library and offices of the Royal Society of Medicine will be closed from Thursday, March 28th, to Saturday, April 6th, both days inclusive; but officers of the R.A.M.C. and Colonial and allied services will be admitted to the library between the hours of 11 and 6.

A DISCUSSION on industrial alcoholism will be opened by Dr. W. C. Sullivan, medical superintendent of the State Criminal Lunatic Asylum, Rampton, Notts, at a meeting of the Society for the Study of Inebriety, at 11, Chandos Street, W.1., at 4 p.m., on Tuesday, April 9th.

THE graduates of the universities of Durham, Manchester, Liverpool, Leeds, Sheffield, Birmingham, and Bristol form a single parliamentary constituency. Mr. Herbert G. Williams, 130, Ashley Gardens, London, S.W.1, honorary secretary of a Conservative and Unionist Association for the constituency (of which Sir Maurice Abbot-Anderson is chairman), desires to obtain the addresses of all graduates in sympathy with the aims of the association.

AT a meeting of the Executive Committee of the General Medical Council on February 25th the President was authorized, in consequence of representations from the Food Controller and the Home Office Committee on drug supply regarding the necessity of the discontinuance of the use of certain fats and oils for the official preparations of the *British Pharmacopoeia*, 1917, to announce the alterations and amendments in the *British Pharmacopoeia* rendered necessary by the present emergency.

MR. J. Y. W. MACALISTER was entertained at dinner recently by members of the Library Association, of which he is president. Sir William Osler, who was in the chair, paid a warm tribute to Mr. MacAlister's services to the medical profession as what would be called, he said, in America a "merger"—that is, a man who got people together and to work together. He recalled in particular his work in bringing the Royal Society of Medicine into being, by the merging of the many medical societies which used to meet in the house of the Royal Medical and Chirurgical Society.

AT a meeting of supporters of the New Hospital for Women, Euston Road, London, on March 14th, which was attended by H.R.H. Princess Louise, Duchess of Argyll, it was decided to rename the institution the Elizabeth Garrett Anderson Hospital for Women, in memory of its founder. Lady Hall, treasurer of the memorial fund, said that nearly a quarter of the sum of £50,000 for the endowment of fifty beds had already been raised. The Right Hon. H. A. L. Fisher, President of the Board of Education, expressed his deep interest in the medical education of women, especially in relation to the school medical service. The other speakers were the Right Hon. F. D. Acland, Dr. Mary Scharlieb, Dr. Jane Walker, and Dr. Flora Murray.

THE Local Government Board is attempting to obtain a complete register of the blind as a preliminary to drawing up schemes for making suitable provision for the different categories of blind persons. The definition of blindness adopted by the Board is "too blind to perform work for which eyesight is essential." The Board is asking all institutions, societies and agencies for the blind, Poor Law guardians, local education authorities and county nursing associations to give assistance, and has issued a circular letter to county councils and local sanitary authorities, asking them to enlist the help of their health visitors, school nurses and other officers, and also of nursing associations not affiliated with county associations and any other suitable charitable organizations.

Letters, Notes, and Answers.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

Authors desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

The telegraphic addresses of the BRITISH MEDICAL ASSOCIATION and JOURNAL are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Reference Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

QUERIES AND ANSWERS.

MOSQUITOS: OILING OF PONDS.

N. B. R.—The following extract from the book by Willoughby and Cassidy, reviewed elsewhere, will supply the information required, but we would recommend the purchase of the book (Lewis, 3s. 6d.):

"In the instances where draining and filling in are not possible, oiling may be done. Crude petroleum or other oil that will make a fairly stable surface film will quickly destroy larvae. Half a pint of petroleum will make a film over about 100 square feet of surface. It should be applied by a sprayer. Failing a sprayer, a sack can be soaked in oil, weighted by a stone, and thrown into the centre of the pond. The oil can also be applied by slow dripping from a tin with a tiny aperture. This method is useful for automatic reapplication in slowly moving water, or at the windward edge of a pond. Theoretically, once a week should be enough for re-oiling, but practically oiling is not a success unless it is done about three times weekly."

INCOME TAX.

W. A. is seeking an adjustment of an assessment based on his predecessor's earnings. Must he return his total fees booked?

*** The basis of "cash takings" is accepted by the Inland Revenue authorities on the ground that in the long run no difference would arise between the duty paid on that basis as compared with that paid on a basis of total bookings less a proper allowance for irrecoverable debts. But where a fresh start is made with the bookings the assumption no longer holds good, as there are no fees for previous years coming into the cash receipts to swell it out to a normal income, and the requirement to which W. A. refers is in accordance with the usual practice in similar cases. It follows, of course, that when W. A. gives up the practice he will not be liable to assessment on fees paid after the cessation of his connexion with the practice.

LETTERS, NOTES, ETC.

THE following appointments of certifying factory surgeons are vacant: Birstal (Yorks, W. Riding), Clwtybont (Carnarvon), Wilton (Wilts.).

SPIRIT DUTY (VOLUNTARY HOSPITALS) GRANT.

THE Local Government Boards for England and Wales and for Scotland are now prepared to receive applications from voluntary hospitals for grants in respect of payments of duty involved by the use during the calendar year 1917, in these hospitals, of duty-paid spirit or drugs containing duty-paid spirits for medical and surgical purposes. Forms of application will be sent only to those hospitals to which a grant was paid last year. Any other hospital which desires to make application should communicate immediately with the Secretary to the Local Government Board for England and Wales or the Secretary to the Local Government Board for Scotland as the case may be.

LUNACY LAW AND EARLY MENTAL DISORDERS.

DR. S. E. WHITE writes to correct an error in the article on this subject published on March 9th, p. 291. The memorial there mentioned was presented in July, 1914, to Mr. Herbert Samuel while he held office as president of the Local Government Board; he did not become Home Secretary until 1916. Dr. White considers this distinction important. The memorial, she writes, supported by the signatures of 330 members of Parliament, expressly stated that the homes or hospitals which it advocated for uncertifiable patients should be free from suspicion of detention and should be "kept wholly outside the jurisdiction of the Lunacy Board." The President took favourable note of this special characteristic, and that the proposal could be carried out administratively by the Local Government Board without changes in the Lunacy Laws, which are only applicable to cases where restraint has become judicially imperative.

ELECTRIFIED SEEDS.

DR. CHARLES MERCIER (Parkstone) writes: I am obliged to you for placing my assertions with respect to the electrification of seeds on the same level as those of Professor Arrhenius with respect to the electrification of growing children. Perhaps you will allow me to point out that the two assertions are not quite comparable. Professor Arrhenius's assertion with respect to the result of electrifying growing children was based on a single experiment. Mine is based on hundreds of experiments. His one experiment was carried out by an ignorant woman who completely misunderstood her instructions. The many experiments to which I refer were made, some by an experienced scientific experimenter, others by practical men whose living depends on their practice in this matter, and who have, as the result of their experiments, adopted the practice. The result of the one experiment was not checked, even by himself, before Professor Arrhenius published it. The results of the experiments on seeds have been checked by experts of the highest authority and of immaculate integrity. No doubt electricity is a word to conjure with, and as I am not unfamiliar with paranoiacs, I am quite aware that effects are sometimes wrongly attributed to it; but I think my contributions to your pages in the last thirty years or so are evidence that I am not excessively credulous, nor apt to accept assertions at their face value, without scrutiny, and without examination of the evidence on which they rest. My advice to those who doubt, as I did, the efficacy of electrifying seeds is contained in the classical, if somewhat discredited admonition, Wait and see.

PART-TIME MEDICAL OFFICERS OF HEALTH.

DR. A. W. LEMARCHAND (Barnstaple) writes to point out the advantages which a part-time medical officer of health might obtain, through his official position, over other general practitioners in the same area. He maintains that a whole-time public health service should be instituted for all districts, the officers being answerable to a central authority, and not to small local councils. This raises a matter of policy which has frequently been discussed in the past. It is one which might properly be brought to the notice of the Representative Meeting through the Division of which our correspondent is a member.

A SUGGESTION FOR EMPIRE DAY.

WE have received a letter, signed by representative medical practitioners and educationalists in Sheffield, expressing national solidarity and determination to see the war through, and advocating the need for a declaration of policy on schemes for social reform. The signatories suggest that the medical and teaching professions are in an exceptionally good position to initiate a response to Mr. Bonar Law, who in the House of Commons lately said he did not believe the spirit of this country was weakening in the war, and that if the question could be put, "Are you prepared to go on with the war until the results you set out to achieve have been attained, or are you not?" the response would be astonishing alike to our enemies and ourselves. The signatories suggest that the two professions should take steps to arrange for public meetings to be held throughout the country on Empire Day, for the purpose of declaring determination to secure a satisfactory peace and to promote schemes for reconstruction after the war. The medical signatories are: Dr. J. B. Leathes, Dean of the Faculty of Medicine; Mr. R. J. Pye-Smith, Emeritus Professor of Surgery; Dr. H. Scurfield, Professor of Public Health; Dr. Sophia Witts, Honorary Secretary of the Sheffield Branch of the British Medical Association; and Dr. A. W. Forrest, Honorary Secretary, Local Medical War Committee.

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

THE following subscriptions to the Fund have been received during the week ending March 18th:

	£	s.	d.		£	s.	d.
Dr. Matilda Hunt	3	0	0	Dr. F. R. Mallett	1	1	0
Mr. Herbert Tilley ...	5	5	0	Dr. Mark Style	2	2	0
Dr. Charles Pollard ...	2	2	0				

Subscriptions to the Fund should be sent to the Treasurer, Dr. H. A. Des Vœux, at 14, Buckingham Gate, London, S.W.1, and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank Limited.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Seven lines and under	0	6	0
Each additional line	0	0	9
Whole single column	4	0	0
Whole page	12	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.